

YOUR

COMMODORE

ARGUMENTATIVE PUBLICATIONS

JANUARY 1987 \$3.95



COMMUNICATIONS
THE ROAD TO THE FUTURE

■ RS232 INTERFACING ■ PICTURE ANIMATOR FOR THE C64
■ SENTINEL—GAME OF THE MONTH ■ PLUS/4 SCREEN DUMPS

For the COMMODORE, AMSTRAD, BBC MICRO, ELECTRON

REPTON 3

THE ULTIMATE CHALLENGE

3



The Screen Editor



The Character Editor



Being pursued by a monster



The fire trap (ignited)



The poisonous fungus grows instantly



COMING TO MODERN DRESS

Are you ready for the ultimate challenge?

Our original Repton game was immediately successful and set a whole new concept in game requiring twelve fully computerized graphics style elements, and clear logical thinking to solve its strategic puzzles. Repton 3 features striking features: from twenty-combined stages of falling water-wheels avoiding the treacherous dragons and floating spirits. This is an extraordinary game reaching new heights in BBC micro adventures, with a challenge more than imaginable.

Last Christmas we saw the release of Repton 3, larger and more challenging than before. Acorn users' technical editor Bruce Smith wrote: "Repton 3 is better than anything I've played on the BBC Micro or Electron. Well, it!"

Now, completely rewritten and improved for the Commodore, Amstrad, BBC Micro and Electron, we proudly present Repton 3. For the first time, a screen designer is included. Try to place screens that will puzzle your friends, then see if you can solve them using the screen editor. Another innovation is the character designer which enables you to design your own monsters, tools, eggs, spirits, diamonds... any or all of the game's characters can be modified at you wish.

Repton 3 is much larger than its predecessors — it has 33 scrolling screens, and poses one so difficult that to complete them all you can enter the prize competition described below. All the fantastic Repton characters (the last 20 added) together with several new features, is creating a new and unique game. It's a challenge to the ultimate. Can you complete Repton 3?

PRIZE COMPETITION

If you complete Repton 3 you can enter our competition. Prizes include over £200 in cash, with letters, mugs, badges and personal summary.

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Amstrad Disk	£54.95	Electron Complete	£49.95

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LIMITED

ACORN SOFTWARE

The screen pictures above show the BBC Micro version of Repton 3



MTA

OUR GUARANTEE

- All our software is guaranteed to be of the highest quality.
- Any software that is defective will be replaced free of charge.
- Any software that is defective will be replaced free of charge.

Dept. PS, Regent House, Bennett Lane, Leeds LS2 1AL

Telephone: 0532 489483

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DATA STATEMENTS

People on Chips

Judge Dredd is just one of the colourful characters being launched on computers in the moment. Millennium House has set him up in Mega City 1 which is a metropolis teeming with dangerous criminals. You must track down unsolved crimes from giant apartment blocks to the city streets, to the death-charged Undercity where the laws of the 20th century still stand.

As well as the violent elements, there are Robotechs, ancient guard machines escaped from their storage facilities and running free. Robotechs are tiny robots run left over from the apocalypse war. And there are the rats and local underworld Undercity dwellers in the lower regions of the city.

The only certain thing is your judge's training and your trusty language pistol with its supply of accurate high explosive, incan-

centing heat-seeking bullets. It's for the C64 and is £9.95 on cassette and £12.95 on disk.

Firelord is a new C64 arcade adventure from Hewson. Set in the medieval land of Toros, the intrepid Firelord must save the land from the evil queen using his power, skill and cunning. The queen has tricked the dragon into getting with the firestone and is torturing the people with deadly fireballs. It's priced at £9.95 on cassette and £14.95 on disk.

Available

Millennium House 66 High Street
Mansfield Park, Englewood-clough
Flower, Surrey E21 4DB Tel 01 947 2618

Hewson 518 Midway Trading Estate
Milton, Wokingham, Gwent GU14 4BZ
Tel 0235 417639



In On The Act

Adventure is releasing a bundle of Commodore titles to see you through those long winter evenings.

The Time in Timezone, has you in person of your missing grandfather who disappeared leaving a cryptic message and a message for an archaeologist and popstar prize. Your quest takes you on an extra-dimensional visitation to Timezone, an extraordinary village filled with the secret assortment of moments, clouds and long life. You have two objectives to find grandparents and get him because if you can't you'll be missed out of Timezone. All sounds very confusing. The only way to see the light is to play it. It's £19.99 on C64/128 disk.

Labyrinth is the computer game of the Jim Henson film starring David Bowie.

In a world of magic and mystery you'll meet such characters as the Firebre, Ludo, Hoggle and Sir Yalahwe. You can explore in a way of finding mazes and corridors. You only have 10 hours to defeat the wizard of the Labyrinth or you'll be ordered for ever. It's available on the C64 at £9.99.

Shogun is a strategy challenge game based on the ancient Chinese

board game of *Go*. *Shogun* is available for the C64 at £14.99 on disk. The rules are deceptively simple. From 194 randomised picture tiles of stones different units, players snap off matching pairs and they run out of stones. The tiles are stacked in the shape of a dragon ready for battle and players can only match tiles from the dragon's head or tail. It involves thinking as many as 20 moves to advance. There are four different options from battles to a game in which any number of players can take part.

Howard the Duck brought to life on the movie screen is now starring as his own computer game. On a remote midway island, Howard must try and rescue his friends from the dark evil of Obstacle and enemies on his quest include fighting the rapids, helping the mutants and making his way to the thrilling finale. As to his journey are a job-pack, his quality skills an ability and a laser. It's on the C64 at £9.99 cassette and £14.99 disk.

Available

Adventure 11 Ford Square, Mansfield,
Leicestershire NG19 7PH Tel 01 431 1101

Lots of Aristocraft

Just because of the rapping public, Aristocraft is bringing out a whole selection of ball and chain games to keep you happy during the season of gold cheer and big red.



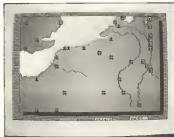
Starz is a space arcade game set in a world of the galaxy which doesn't obey any natural laws. This zone leads into an area of Crazy Space. As an under-producter at Microsoft University you have been detailed off to find out what exists at the apex of the cone-shaped Crazy Space.

Summed up by the words about 'fun up with great control'.

It's for the C64 and costs £9.95 on cassette and £14.95 on disk.

Another very arcade game for the C64 is *Minister Mird's Death Run*.

D A T A S T A T E M E N T S



Black is a Canadian Mapstar and Tarantula release. It's dodging its way along the top of the Trans-Canada Express. Keep your head and keep shooting in the helpful heat from Amstradsoft. It's £29.95 for the C64.

Hovvieser Shoot Out is another breed of goodness, no nonsense, heads down, mauling shoot out game. This time you're a cornered gangster, fighting for your life in an old dusty warehouse. The cassette version for the C64 is £9.95, disk will cost £14.95.

There's also **Shadown** which will take you back to the action packed days of World War II. Based on the Lee Douglas book of the same name,

you are in command of the German forces and must attempt to invade England using the Black map strategy.

Special features include: Mine drivers pop up the system, has relief graphics, historically and geographically accurate, scrolling 3D terrain and two variations, pop up message windows. The game is available for the C64 and is £9.95 on cassette and £14.95 on disk.

Timeline

Amstradsoft 46 Long Arch Court
Garden London WC2E 9JH Tel 01
834 3437

C16 and Plus/4 News

Dragon's Lair is now available for the Plus/4. It's a computer age rip-off in which you have to smoothly picture of the rub and lunge within a time which can hold traps. There are lots of destructions to make you feel uncomfortable but they could help you too.

Characters featured are Margaret Thatcher with Diana, Ronald Reagan and computer industry figures such as Alan Sugar at Amstrad and the respectable Clive Sinclair.

The new Plus/4 version costs £2.95.

Brutalhead is a new C16 Plus/4 release from Amstrad. Amstrad promises to have you glued to your joystick with

the first action bidirectional screen.

You have been chosen from thousands of soldiers to join an elite marine unit being trained to complete a mission impossible. Your task is to secure the bridgehead. There are eight actions to complete, each of which is heavily patrolled. Your movement is limited so you must read strategy dumps to replenish your supply.

Timeline

Bowen 264 Weybridge Road
Weybridge London Surrey TW20 2ET
047 9422
Amstrad 46 Long Arch Court
Garden London WC2E 9JH Tel
0122 824378

Communication

From early December, **Prosal** Subscribers will be able to access **Telecom Gold** - British Telecom's electronic mail system. This follows the activation of a new X.25-based gateway link between the two services. This is the first stage in establishing full inter-connection between the two networks.

The new link incorporates software that enables information sent on a 'teletype' ASCII type terminal to be formatted in a **Prosal** page style.

Additional features include text editing, point to point messages and simpler access with a single gateway frame for each **Telecom Gold** system which takes the user straight to an ID entry point. **Prosal** customers wishing to access **Gold** will be routed from the **Prosal** messaging database.

As all members of **Marwest** are also in **Prosal**, this new facility is also available to them.

Timeline

Prosal Headquarters Telephone House
Temple Lane London EC4P 3HT Tel 01
832 3036

Hangar Bargains

Competitions are always popular at this time of year and **UK Gold** has brought out a **Shoot 'em Up** collection for the C64. There are four games on the cassette the names of which will no doubt be familiar: **Zaxxon**, **Dropzone**, **Star Wars** and **Fort Apocalypse**. All four games can be had for £9.95 each cassette.

Born July, a collection house which specialises in compilations has recently released **Computer Wits** 1 included on the tape are **Geoff Cooper's Strongman Challenge**, **Blipper Gier's** **Wishwood Island**, **JD Lumsden's** **Crazy Comets**, **Systema's** **Don Herbert's** **Demmy Run Attack** of the **Marble Caves** and lastly **The Adventures of Bond**. Available for £4.95.

All the games have been released in their own right previously. The compilation is a new cassette set.

Timeline

UK Gold Unit 2/3 Heddon Way
Bedford Bedfordshire MK42 7EF Tel 021
255 1400
Born July 264 Bell Street, Epsom
Surrey RM2 7AD Tel 09373 23001

DATA STATEMENTS

Rite and Piece

Intelligence, the French games company, has a new product out already for the C64. It is not a game for bridge beginners but is aimed at the experienced player.

It incorporates the seven computers recognised by most players as well as 99,999 pre-programmed deals. Other features include a scoreboard, a cheat screen, replay deal history and a facility to deal specific cards to certain players.

Also from Intelligence is an arcade adventure called *Die II* which plays as a baby-sitting game where Alfred has been sent to look after little Valentin. Valentin is an incredibly annoying child and runs off, leaving Alfred to find his way around an enormous house and cope with all the havoc

that this involves.

Blanco is releasing a C64 game based on the ever-popular BBC soap opera *Eastenders*. It will feature all your favourite characters, and the aim is for more men and women to keep your eyes peeled.

The Sparfingers range of £199 budget games is being expanded with two new games for the C64. *River Journey* is a water simulation of a dangerous river in which you have to negotiate such hazards as river maps and drawdowns in an attempt to guide your steamer launch into a safe haven.

Monday March features a half man/half monkey creature who is searching for the holy grail and having to fend off enemies with lightning bolts.



Adventure Creations

located in Red Sea is has now branched a new field to cater for games writers with the successful *Graphic Adventure Creator*.

Winter Wonderland is the first of two new releases on the new label. It's an adventure set in the Himalaya and you must locate a lost civilization which is apparently running parallel to your own but independently. The adventure begins with a plane crash and once the civilization has been located your attempts to escape back to civilisation begins. Just released, it's £199 on the C64.



The Sporting Armchair

Software companies are always trying to make sports simulations more lifelike. Now New Concepts has come up with the idea of a sailing game in which you mimic a man surfaced to sail a kayaked and learn sailing techniques with the palm of your hand. *Sailflying* is the game and it has been endorsed by the British Sailing Association as a game which teaches the sport as the real thing way.

Back to more men of the ring sports, with another martial arts offering from Melbourne House, *Fist II* is the sequel to *The Way of the Exploding Fist*. Once more the Warriors of the Exploding Fist must contend not with their fighting skills. The skills are difficult to acquire and are come by in two ways: experience and from the secret scrolls. Described by Melbourne House as a crude, adventure strategy, simulation and much more, it's out on the C64 at £9.99.

For those who like a little more variety than US Gold/Epic has just branched *World Games*. Featuring such martial events as discus throw, shot put, hammer, javelin, ball pump, ball throw and much more. Sorry no welly throwing.

It's a cartoon and costs £9.99 on C64 already and £24.99 on disk.

Touchline

New Concept 17 Dublin Street
Canter, Ireland Tel: 01519 17603

Melbourne House 68 High Street
Hampden Road, Kington-upon-Thames, Surrey KT14 6BB Tel: 01 840 3011

US Gold Ltd 111 Midland Way
Birmingham B9 7AE Tel: 021 715 1102

The other release on the Medallion label is *Apache Gold* in which you battle against the people and circumstances in the wild west. It's also £7.99 on the C64.

Both these games are winners of the Gold Medallion award, presented by Incentive for the best games produced using the C64 which has recently topped the worldwide £1 million sales mark.

Touchline

Incentive 14 London Street Reading
Berkshire RG1 4BQ Tel: 0734 184618

THE FIRST SERIOUS SOFTWARE AT UNDER £60

Now from Timesworks comes a range of advanced distributed software that gives you total power and total performance. A range that increases the capabilities of your Commodore 128. And at a quite remarkable price.

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TIMESWORKS



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Which Modem?

After deciding how you want to connect your micro to the modem—cablemodem or analog—you need the modem itself.

This will be your critical purchase, as you can get as little as £70 or as much as £600 before buying a modem you need to decide in advance whether you will use it on a regular basis or just casually. Different modems communicate at different speeds and generally speaking the faster it can operate the more it will cost. The advantage being, the faster it can send and receive information the quicker you can get the information you want and, as modems rates for telephone charges that is an important factor to consider.

The range of speeds that modems operate at varies, but seems to be mostly 1200 baud rates. As these are known, are common. Typical speeds on local rates include 300/300, 1200/1200 (half-duplex), 1200/75, 75/1200. The most expensive modems can operate at 1200/1200 full-duplex and even 2400/2400 is in the line with the Price Index (see table).

The three terms half-duplex and full-duplex mean that data can only be transferred one way at any given time in the case of half-duplex, and both ways simultaneously with full duplex. Modems which offer 1200/1200 half-duplex normally require some special software that switches between sending and receiving, and normally only need when transferring information between two people, often referred to as multi-user. In the case of 1200/75 baud the computer you call will transmit information to your micro at 1200 baud full-duplex while your computer will transmit at 75 baud. To get these baud rates into perspective a general rule of thumb can be used by dividing the baud rate by 10 to get the number of characters of information per second for 1200 baud roughly means that 120 characters of information will be transmitted each second.

Most modems operate at dual band rates or they can operate at a number of speeds. Typically this would be 300/300, 1200/75 and 1200/1200 half-duplex. More serious operate at specific speeds and as a general rule the following applies:

Business modems - 300/300, 1200/1200, 2400/2400
 Home modems - 300/300, 1200/1200

Verbatim modems - 1200/75

Electronic mail - 300/300, 1200/1200
 Full duplex 1200/75

Looking at the above list you may say that the type of service you are should be taken into account when you purchase a modem. If for example you wish to access Verbatim servers such as Macromed/Protrial then it is essential that your modem is capable of operating at 1200/75 baud. On the other hand, if you wish to use the electronic mail (Email) or online data bases then it is best to purchase a modem that can operate at 1200/1200 full-duplex as this is a lot faster than the 300 baud models and it will enable you to send and receive information more rapidly than saving time and telephone charges.

Some modems are supplied with an auto-dial option enabling the telephone number to be entered at the keyboard rather than manually dialed. And auto connect option will do just that - automatic will answer the phone upon an incoming call. Other more subtle features are auto-handshake which enables the modem to automatically set itself to the correct baud rate when the host system has been connected to. This saves a lot of time twiddling on the user's part. The up market range of modems even allow frequency dialled numbers to be stored internally as well as complete external voicemail.

Connecting the modem to the telephone line requires one of the new ITT lock sockets (model 600 telephone socket) to be fitted into the area in which the modem is to be used. If the modem is fitted with a telephone socket then the handset is connected to the modem and the modem to the wall socket. If this is not the case then it will be necessary to install two wall sockets, for the modem and the other for the handset or use a splitter.

Whether modems were chosen automatically or not approved. There established by checking for a given approval stamp which will have an approval number on it. Use of equipment that is not approved is extremely an offence.

Choosing the Right Software

Currently there are two serious software standards in use in the UK, varding and verbatim. Varding operating varding software displays only characters as one colour with the

not varding as more information is sent/received. Verbatim displays pages of information in colour with high resolution graphics.

Each type of standard needs its own features and there are certain items which you should look out for when having a serious package on disk, tape or cartridge.

Borrowing software (also known as dumb terminals) should allow hand rates to be set by the user. It should operate in half or full-duplex mode and accept all the common ASCII control codes including BEL, TAB, CR, LF. Also check that the software will enable you to specify different ASCII and PETASCII. Some means of saving incoming data in ASCII format should be available, and ideally a facility enabling the user to prepare text messages online should also be provided.

Because the PTSM was not designed for computer errors in the transmitted data of less cost. To get round this the length of the data word can be set (usually to eight bits). Other a including start and stop bits as well as parity should also be user selectable. However even with parity and stop bits an up the error still keep in very much a high rate to have. Errors will not necessarily ring in and the can be a problem where transmitting files. An error checking protocol called MODEM (also known as MCDM) is a system to correct packets and it allows text and program files to be transferred error free. This is accomplished by sending the file in small blocks. Should a block be corrupted during transfer the receiving end will detect the error and automatically request the packet again.

Other features to look out for are an online clock which is useful for keeping track of how long you have been online. Split screen operations divide the screen into two parts, with the upper part of the screen used for displaying incoming data while the lower two or three lines at the bottom are used for user input which will be transmitted. This feature is especially useful when playing online adventure such as MUD (Multi User Dungeons) or when using an online BBS (bulletin board). In particular use is a directory in which you can store frequently used numbers on disk, to allow the parameters for the particular service (board length, parity etc). What would such an online

del modem it enables you to select a service by pressing a key. Then it dial the modem and set up the software appropriately.

The modem standard is radically different to the scrolling type of software. Although modem systems operate at 1200/75 baud an option to set the speed to a different baud rate is particularly handy in *Proser* which is the largest videotex system in the UK, will soon introduce multiple baud rates including 960/300, 1200/1200 full-duplex operation. Also of particular use is a 'remote *Proser*' rate of 75/7500. In this mode your computer acts as if it were *Proser* and the other would act your terminal as if they were using *Proser*.

Features to look out for in all *Proser* packages include page refresh for when data becomes corrupted; a personal page facility and some means of tagging pages. Finally tagging allows the software to remember particular pages that can be revisited at the press of a button. An option to save a frame to disk is also essential.

A major feature of most videotex systems is teleconferencing. Basically teleconferencing is software that can be downloaded and used to talk or tape. For the Commodore range of services special interest (email) were developed and format has been developed by Microsoft called *Visiting*. This is the standard for all videotex teleconferencing in the Commodore machines and is found in many packages. Readers are advised not to purchase videotex software that doesn't have a downloader of the Microsoft variety.

One other feature worth looking out for is an offline mailbox option. This enables you to prepare mailbox messages offline and then send them when logged on.

It is worth noting that some packages that incorporate both types of standard are found to lack some of the features mentioned above due to lack of available memory.

A final note about software selection. There are literally hundreds of pieces of videotex software for the Commodore range of machines available in the public domain. In other words free. These can usually be obtained from user groups or clubs, such as ACPVG or CLEC 44.

What's Out There?

The number and type of services avail-

able is almost unlimited. Remember, computer teleconferencing knows no boundary and it is just as easy to dial up a bulletin board in Australia as it is to dial one locally. However, the types of services available can roughly be split into three categories, bulletin boards, databases and financial services.

Bulletin Boards

These were amongst the first services in this country. Basically a bulletin board is what the name suggests, a public bulletin board, tonight electronic. The BB is a special piece of software which runs automatically on the micro. They are of the scrolling type and normally operate in 300 baud full-duplex. The BBs can run by themselves on their own time, and allow one person to use the board at any given time for about 15-30 minutes. A board will offer an electronic mail system as well as a public messaging system. Other features to be found on BBs include special interest groups (SIGs) which are areas on the board devoted to one particular subject such as computing, finance or whatever. A large number of BBs offer free software which can be downloaded in either ASCII or XMODEM format. The good thing about BBs is that there is a wide choice of them to log on to and there are not run with commercial intent as most but only that but there are only a phone call away!

Databases

These are commercial ventures and usually require you to subscribe before access is permitted. Subscription charges differ from service to service and are also governed by the type of information they provide. *Holoburn's Home DBs* such as *Members and Company* offer the micro user a wealth of information and software - some of which is free. These DBs also offer other types of value added services such as a private mailbox for each subscriber as well as advertising prices and public messaging facilities. In the case of *Microsoft/Proser* the service is of the videotex standard while on the other hand *CompuLink* operates on its own protocol.

The DBs which are aimed towards the business sector tend to be of the scrolling format and are rather expensive to subscribe to. Information

provided depends on the individual DB and this can include references to publications, share prices, legal news, referencing and so on. Many offer very powerful search and cross reference facilities. This type of service is of particular use to the business user and those who are engaged in research.

Electronic Mail

Better known as *E-mail* systems. These are set up for the purpose of individuals to transfer information to others via the E-mail server. Again this type of service is usually of the scrolling type and is best accessed with a 1200/1200 full-duplex modem. *E-mail* systems such as *BT Gold One-To-One* and *CompuLink* offer very comprehensive message handling services as well as select radio paging, teleconferencing and so on. Most offer one-to-one standard services such as spelling, electronic, language, word/grammar services and debt preparation and much more. The distinction between DBs and *E-mail* systems were blurred as the two tend to offer features that the other type has. Most *E-mail* systems are geared towards companies and individuals who have a lot of text they need to transfer, however an increasing number of private individuals are now beginning to see the benefits of these services.

Not Best of All

The best type of service is the one that you and your friends can provide yourself. Two-to-one communication is great fun. Both you and a friend arrange that one dial's another's pre-decided time (and baud rate). The idea is not to kill the art of conversation (text talk is a terminal where you can talk to the person themselves) but to get used to the idea of communicating. *U2U* can also be used to transfer your own programs and text between each other and can be especially useful for making those emergency backups we all like to do now and then.

What ever you do do in the coming world have fun!

David Janda can be reached on the following services: *Proser/Member* 84774/290 One-To-One 134/0001, *Gold/Modem*, *TEMA0/300* and *CompuLink JANDA*.

BB List

Here are the telephone numbers for

NAME	TELEPHONE	RATES
BATES 1	0944 274565	500
Boston Inc	01 733 6135	V/Data
Chadd (Tas)	0213 464 126	V/Data
C View	0782 544374	V/Data
FRBS Stanton	0743 267954	500
Game at Home	01 888 8884	V/Data
Haskins RR	01 905 1927	V/Data
Housing Transfer	0732 944059	500
Livingtons Bils	056 676316	500
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some of the more popular RR. V/Data in the rates column indicates that modems will be needed to access the service.

Compu Software

Microsoft packages are available for the Commodore 64/C128/128D. There is just a small selection of the more popular ones.

Missing - A Windows package for use with the Commodore modems. Features interactive development and efficient modems editor as well as easy, easy screen-dump routines. See October issue of *Byte* for details for free offer to Compu subscribers. Available on disk, had access from Microsoft 800, 275-2143. Price: £11.99 disk, £1.95 cassette.

V2 Missing 32 cartridge - Incorporates all the features of the above but also has dumb terminal software as well. Other features include auto-dial/answer detection and directory. A cable linking from the cartridge connects to the modem via an RS-422 socket. Can also be used with RS software also available from V2 computing (£99.95 on VAT). Available from Modem House (0782) 213132. Price: £49.95.

HomeFax - Part of the HomeFax package from USSoft. Features included and sold separately by Asuka with HomeFax reports on RS232C adaptors to be fitted and operates at 9600/500 and 1200/1200 full-duplex. The package also features XMODEM file transfer and a special graphics mode called VidFax that is used when on CompuServe.

NOTE - There is a tremendous amount of free public domain communications software available for the Commodore range. Two very good sources are *CFUG* and *CECP*. Membership is £12 per year which includes three disks of software of your choice from their library.

Modems

Commodore Modem - Operates at 1200/75 and 1200/1200 full-duplex. Contains ROM software and driver specifically written for CompuServe. Can also be used with word processing (extra) and Microsoft disk to get access to Microsoft/Prose/Prose ranges from £39 to £70 for the same thing to shop around! Contact: Modem House or CompuServe.

Enterprise 1 & 2 - A superior version of the Prose range. Enterprise 1 offers 300/300 and 1200/75. Enterprise 2 offers 1200/1200 full-duplex. Prices: £114.95 on VAT and £197.45 on VAT respectively. Available from Kirk Automation Ltd.

ServerFax - This is a specialist professional modems with just about everything you could ever want. Can be upgraded to a 2400/2400 fully buffered Hayes compatible modem with printer port. Price: start from £279 - available from Post.

MultiModem - Cartridge with superb software and modems. Plugs into the cartridge and has five rate telephone sockets. Speeds include 300/300, 1200/75, 75/1200. Vendors and word processing software. Price: £98.50 on VAT. Available from Modem Technology.

NOTE - Online services such as Microsoft and CompuServe have special deals on Modems for those who subscribe to their services for a whole year.

Online Services

Microsoft 800 - £18.50 per quarter gets you access to Microsoft as well as the rest of Prose/Prose. Features include modems, checkers, MUDs, software etc. Soon to have a link to Telebase Gold. Special features include local call access and free usage in evenings and at weekends.

CompuServe - Database dedicated to Commodore 64 and C128 owners. Bags of free software to download including demo music etc. Need Commodore modems to access a Special features include: MUDs, Prose/Prose. Three test subscriptions. **Modemlink** - A database with a database. Operates as part of Telebase Gold. Modemlink is the cheapest way of getting onto a dedicated BBS system then also offers online databases as well. Besides all of Gold's features there is a special area just for Modemlink subscribers. Special features include Teletext, Telex, Email, bulletin board and a US link to Microsoft's Disk in USA. One off fee of £3 plus £2 monthly maintenance.

NOTE - There are quite a few hidden costs involved when using the above mentioned services and readers are advised to request a time details of all charges before subscribing.

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Club 128

*Plug in your 128, connect up your modem and read on
for the latest news from Compunet*

By Neil Day

As those who saw the Commodore modem going down last week's edition of the Independent Compunet Club Stall at the Manchester Show will understand why some people are commenting that the system has been under a bit of strain over the last few weeks. The first modem offer has attracted a lot of new subscribers, and an expanded user base can only be good news for all of us in the long run. In the short term, however, the system has been behaving a bit more heavily than usual at certain times.

Night-time, briefly before any difference, and on a Sunday morning to lunchtime seems I found it very fast indeed. However, as appreciably slower sometimes, especially in the evening. When demand has increased so previous occasions Compunet has been brought back up it speed pretty quickly. Let's hope that things are settling down again by the time you read this.

Updates

Graveling apologies are offered for several frames that have been announced in earlier articles and have either lapsed or have moved between the time of writing this column and its publication. The problem is inherent in trying to use paper and ink to keep up with a fast moving computer data base. Your Commodore has very obligingly let me use three lines, (GOOD YRCHM) as a placeholder for (GOOD YRCHM) and (GOOD YRCHM) as a placeholder for (GOOD YRCHM). These will bring the last ones on the whiteboards of these wandering frames.

Please check at a couple of days after this article appears.

C128 Index

In previous Club 128 columns I've named indexes and character frames.



Recently a new service has started which will be of particular interest to C128 gamers. At least 10000, 128 News Update, you should not be updated by FUMMO. It is called 128 Software Index and contains a list of C128 programs available on Compunet. FUMMO requires no prior who updates C128 programs to query him with its location for inclusion in his list. In short a self-sufficient system, he will continue the service with it as an excellent one. A few more times wouldn't go amiss either in concerning this worthy visitor!

Characteristics

An easy-to-use character editor called "Character" is available free of charge at frame 20000. This utility lets you modify letters from the C64 character set and can relocate them in memory. It shows you the results of your labours on the screen as you work. I am a bit dim about things physical ("visually oriented" is the usual diagnosis) so I was puzzled to find my screen filling up with hundreds of grey dots and spaces while I was modifying a character. It turned out it the mistake had a terminal case of check-out! The dots got bigger and

bigger as I added more pixels to the character. I was scarcely defining. After pondering this for an embarrassingly long time, I finally realised that I was modifying character number 32 the space. This is the code for the characters on the blank bits of the screen!

The rather LAMP, does a little professional programming and has written some interesting educational programs made targeted for post-secondary. GOOD YRCHM, and (GOOD YRCHM) and (GOOD YRCHM) (10000). There are changes for these programs.

Mach 1

Your Commodore readers will remember the Mach Assembler which was published in the magazine. As I write, this program is still available in the Four Commodore directory (GOOD YRCHM and (GOOD YRCHM) (10000). SCI has been working on an updated version called the Mach Language Development System (MLDS). This is available for £2 at frame 20000. The new version has several extended features and is the speedily compatible with the Mach Assembler.

In comparison with other assembler and monitor packages it is

Sense of Adventure

Adventures are still pouring out of the software houses and boggling the minds of fans. Your Commodore brings some much needed aid.

by Pete Greenberg

There is no American software house which is quite so making any appreciable headway in this country. The software is not cheap but usually offers something different from regular adventure games found on the shelves. Only disk based versions are available and the three that I have come across are *Amazon*, *Now Before the End* and *Perry Mason - The Case of the Mysterious Murder*.

Amazon is based on a plot written by science fiction author, Michael Crichton, who is better known for his novels *The Jurassic Storm* and *The Terminal Man*. The game starts with the destruction of an archeological site in the Amazon jungle. This was once way to have an antiquated lost city of Chink, where it was thought they might find a new form of mankind.

This type of survival is particularly important in various bi-tech applications concerning national defense. This explains the involvement of National Satellite Resource Technology (NSRT) a top-secret research and consulting firm. You play an operative for this organization, who was to be sent out to the doomed expedition.

Immediately after the counteraction confirming that something is terribly wrong, you are sent on a one man mission to cut things out.

The game comes on two disks - both double-sided - as eight a highly operations. Unlike many conventional adventure games *Amazon* does not require extensive mapping to create you know where you are. It is very much like a paperback novel, pointing at the beginning and moving your way through page by page to the end.

The game revolves around puzzles that have to be answered before any further progress can be made. There

are a few 'bad roads', but you are inevitably forced back to the 'main road' to continue to the next puzzle. There are several pages of instructions and background information, including a map, a lot of words understood by the game and a coded help sheet.

Playing the game occasionally activates use of the disk drive, with many reports stating it to stand away for moments at a time. Although the disk access is not particularly slow, the extended waiting can become a bit of a bore at times. At the beginning of the game you are reminded to create a 'save disk', in which you can save up to 10 game positions - do this at the various opportunities!

The extraordinary language takes on messages and is interesting the first time around but you will not want to wait through this each time you die or make a silly mistake! Things start in the NSRT control room where a video link reveals the expedition's demise. You are called up to your controller's office to be briefed.

Among other things, he will ask

you to spell out your name. Take care, later in the game you may be asked your name - misspell it, even by substituting lower case letters for for upper case, and you will be accused as an impostor and will have to start again!

At noon as you leave his office, enter your first game save. From then on it's up to you, but the more well equipped those initial on plan missions. You will be given some extra equipment before you board a plane at the start of your assignment, check the contents carefully.

Your first task is to pick up some helpful information from a Professor Benton in Manaus, unfortunately he is killed before you can talk to him. Nevertheless, you do get some help in the form of Pam the Professor's parrot. This initiative contains a lot of knowledge and can often give you a clue when you are in a tight spot!

In due course you are parachuted into the Amazon jungle and have to report back to NSRT via your computer/terminator. This then enables headquarters to keep track of your location and on several occasions they will guide you out of trouble by giving you map information to aim for.

Searching on your computer changes the on-screen photographs of where you are, to what is possible, the computer's display. You must enter your security code before NSRT will complete the connection, you create a sort of 'this didn't you?' Having completed instructions, the computer display clears - taking 10 seconds to do so, sigh!

At one point you have to locate a rising band of monkeys who have stolen your backpack. Use of a joystick is recommended but this means a load out of control and is



more of a nuisance than a challenge.

Altogether this game is an unusual attempt at trying to create something a little out of the ordinary. The basic story line is good, with realistic graphics - which may be switched off to speed the game up - and the game could well be recommended to beginners but might prove too slow and predictable for the more experienced adventurer.

Red Hawk?

Melbourne House's latest adventure, *Redhawk*, is a game with a difference. The graphics are in the form of scrolling comic strips, which means that, as the game is about Redhawk, a comic type superhero.

At the start of the game Kevin O'Leary, the normal human side of Redhawk, finds himself in hospital suffering from amnesia. Whether or not he had some previous experiences are not to know but now he is searching for a job as a comic photographer. Having got him settled in his new job you may now turn into whatever adventures come along.

Having lost any previous memories, you lose the chance of making him act in either super-hero or super-villain. Redhawk's popularity mainly shown graphically towards the comic strip, will affect the interaction of the other characters. Tied to what the 'lock is going on, it seems best to choose here rather than villain.

SAY (or SHOUT) 'KWAH' (with quotes), and see how well things into the fearless Redhawk. He is able to fly and has most of the powers claimed for super-heroes. The main snag is that as Redhawk has energy output as high and his resources as power fairly low' is a means to being plain Kevin as very necessary after only a few minutes.

Location discrepancies are almost unimportant as they are all included within the 'comic strip' shown at the top of the screen. The strip has three frames that scroll across the screen from right to left at each command. You would think that this would show the present and two previous scenes but that is not so.

Each command of understood, is opposed by the Kevin as the strip and only then returned - two frames for one command. This would not be so bad if the frames were shown quickly but they are not. It is quite possible if you want to do it, go from location A, to location B, if you were having

to wait for the frame to be shown to be told "Kevin looks for a way back but can't find one".

The game is played in real time with a digital clock ticking away the seconds as you wonder what to do next. Fortunately the clock is stopped if Kevin dies and undetermined what you are trying to get him to do. Unfortunately this seems to happen all too often, but knowledge of current 'adventure talk' is really lacking.

The inability to understand the command OPEN DOOR brought up the question: 'open' confuses Kevin. He does seem to be a very confused young man. Another change from normal practice is the use of EXAMINE. Here it literally means a body search, perhaps it was not surprising that a young lady I met early in the game, objected quite strongly when I told Kevin to examine her!

For all its differences to normal 'adventure speak', Kevin will understand fairly complex sentences with suitable commands separated by commas and escaped. A number of common commands are shown at the bottom of the screen and are entered by CTRL and one of the number keys. The game has a STORE facility (a version of RAMSAVE) with a manual tape save/load to assist for moving your position between games.

Overall *Redhawk* was rather disappointing and boringly slow when you consider the lack of unusual either narrative or graphics. The game puzzles are good with the twist that something startling is just round the corner but the lack of any real atmosphere detracts what could have been a really novel adventure.



The French connection

Intelligence is a new name in the adventure world as though it may be based on a great deal more in the future. The first offering is an adventure: *Madagascar*. This is best compared with *Conan* or *Indiana Jones* with a band of intrepid adventurers exploring a strange land and the dangers and intrigues they find in their search.

Then French comes to terms with a fairly long background story to set the scene for the adventure. The good and just King Jeanne has been killed on suspicious circumstances and his lands taken over by the evil Yared-Nor. It is the task of would-be adventurers to search out and find the means by which to overthrow this reign of evil.

Madagascar is not too unusual in size and is pretty large with only 37 blocks shown on the disk. A further formatted disk on which tape is required if you wish to save your party's progress for use on your next visit.

On loading the game you are given the choice of starting from scratch and forming a party of your own choice consisting with a previous adventure or using a ready formed party under the leadership of a French Paladin, Syllia.

If you are new to the game it is probably best to use the ready formed party. They will enable you to get some idea of what the game is about, how it works and also which characters are best in what. Initially death comes quickly and your first explorations will be over quite rapidly. But hopefully you will have learnt something useful before all ten characters have been lost over.

If you choose to start with your own party you must first create the two characters who will make up the group. For each character you have to appoint 80 points (maximum five maximum 20 in six categories - Constitution, Strength, Knowledge, Wisdom, Dexterity and Appearance. For Knowledge and Intelligence for Appearance - Charisma or Charisma).

You must give the characters a name (up to 16 letters) and define their sex. Five different races are possible - Human Dwarf, Elf, Gnome, Elf or Elf-Gnome. (Maybe Gnome?) but there is no information as to the effect of the choice. There are six different character types - Warrior, Ranger, Wizard, Cleric, Thief and Magician. This choice is not entirely open as each of the last five

must have over 14 points given to them in their primary attribute - Strength, Wizard Knowledge, Cleric, Wisdom etc. Any character can be a Warrior (press key-75, suddenly).

Your first choice is the character's colour, then helps define the character of the same type when they are shown graphically during the adventure. Once a team has been created - now it is to drink or tape. Creating a team is not a long process but it is important not something you will want to repeat if you ever die in the first few minutes of play!

You start in the wilds north-west of a village and west of one of the Chateau (it's a French game, remember!) Your team is dispersed by a magic figure that can be moved around the scrolling countryside with direction keys N, E, S, W. There are various terrain to be explored - plains, forests, hills and swamps, all of which are possible. There are also some of water where you will need a boat to get across and flood situations that are impossible.

There are a number of villages where you can buy or sell items that you may need, all villages appear to be the same when you get inside but they do not make them any the less unique. There are 10 characters, one of which controls the evil Wizard-Nor but the other nine must be varied and their parties asked to help you complete your quest.

On entering either village or chateau, the display changes from a general plan view to a limited 3D picture. This shows you the location, the members of your party and any objects or creatures present. To the right of this picture is a brief sketch of your characters, their experience and life points. Also shown is a list of visible objects or creatures. A maximum of four things can be seen at one location with each being coded A-D.

The Action key, F1-F4 will display a full status report on each of your characters, including any attributes, food or money held by them. Each character may only carry four objects and the full status report will give each of these a number (1-4). You must remember which number refers to what as *Manadrone* has a novel input routine that requires the player to type a command in highly abbreviated form.

Each character has a number (1-4) and the 39 verbs that are understood

are recognised by either one or two letter abbreviations. This is a little confusing at first but once memorised, makes commands to be issued very quickly. I B U C will display on the screen as SYRELLA RUYS MEDICINE, the medicine being object 'C' shows, at that location.

Several verbs support two objects, so I A T A 3 answers to TOSLINN ATTACKS HARRY WITH SWORD - this is why you must remember the old Tortoise's maxim, 'any '2' is a sword'.

As your party moves around the 'map' of *Manadrone*, they will be attacked by a variety of wandering monsters. With the low experience points the characters start with, this can be fatal. Experience is gained for most successfully completed actions - discovering hidden traps, opening gates, finding treasure and of course defeating the more monsters.

Damage to any member of the team either from an attacking monster or a boobytrap, will cause a loss of 'life points', zero points and that person is dead. Fortunately in each village is a supply of very limited medicine - not expensive and should be taken by everyone on regular intervals! One slightly annoying point is that once a member has bought an item from a village shop - it cannot be bought again, without leaving the village and re-entering. Buying stacks of medicine is a little several minutes in your effort to wait out.

Life points may also be replenished by eating or drinking. Food may be bought in the village but the command is strange - SYRELLA BARTERS 8, will get her 8 units of food for a cost of 14 units of money. Is a number of locations within the chateau you can find something to HUNT - rabbits for instance. These too can be taken to replenish lost points.

If you have a well experienced Thief in the party you can steal your party's funds to almost any level providing you have the patience to keep pinging it and out of a village stealing something and then heading it over to another member of the party to sell. This takes action is necessary, so, if in sight, all objects, money food and some life points are taken from the thief as a punishment.

Although you can TAKE many of the things you will find in the chateau - you cannot drop them

nowhere and no more than later - they are gone for good. Also the word 'drop' is not understood (DR is used for DRINK), you must use the command word LAY instead!

The characters may talk (ASK) to many of the things they meet in the chateau. The responses are brief and usually give some form of explanation about the puzzle to solve. Other commands include OPEN, REEL, SHOOT, READ. Not all commands are successful at first, so it is doubt - try again perhaps using a different verb. 'TM' will usually repeat the last command and can be a boon when fighting.

Once inside a village or chateau, it is possible to split your team up and control them independently. They could then theoretically each explore different chateau or simply different rooms in the same chateau. There did not seem to be any real reason for them to split up - but it is an interesting option, how about a multi-player game?

There are a number of special spells available to Wizards - LOCK, TELEPORT, SPELL, PARALYSE, HYPNOTISE and POTIONS. I did not find them particularly useful and as they all use up some of the user's life points, I used them very reluctantly. There are two special spells for one or more of these commands, but if as I have not yet found it!

The pictures are fairly chunky (think graphics that show very quickly) and although complex in outline, on the same wall for what is after all a fighting adventure with added puzzles. The puzzles are far from clear so do not expect to solve them quite at once, two or three attempts. Many of the chateau have creatures that MUST be fought before you can get to all the rooms. The diversity of these creatures is quite amazing, I do not think that I have ever come across a game with so many different monsters!

On NOT type or HELP, the menu takes you back to the initial menu - if you have saved your game position, then you can return to that point otherwise you will have to start again!

An interesting game with a lot more to it than first meets the eye and is far more longer in *Ultima III* or *Ultima IV* but nevertheless a good challenge, with some of the good points associated with role playing adventures in the 'D and D' tradition.

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FORM 181

GAME OF THE MONTH

Sentinel

Guided by the Sentinel's past

Exploring old mysteries and the new realm beyond

interviews with the game's creators

By Eric Daulton

Sentinel was written by a pair of indie game developers, the "SQUAD" of David Cross, Benjamin Brackley, and the late Michael Williams. It's a puzzle game. But it's more, too, because it's also a story about a murder.

The Sentinel is a murder mystery, but it's also a puzzle game. It's a puzzle game that's also a murder mystery. It's a murder mystery that's also a puzzle game. It's a puzzle game that's also a murder mystery.

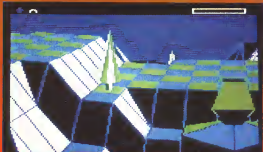
The game is a puzzle game. It's a puzzle game that's also a murder mystery. It's a murder mystery that's also a puzzle game. It's a puzzle game that's also a murder mystery. It's a murder mystery that's also a puzzle game.

The Sentinel is a murder mystery. It's a murder mystery that's also a puzzle game. It's a puzzle game that's also a murder mystery. It's a murder mystery that's also a puzzle game. It's a puzzle game that's also a murder mystery. It's a murder mystery that's also a puzzle game.

Meanwhile, there's the other side of the puzzle game. It's a puzzle game that's also a murder mystery. It's a murder mystery that's also a puzzle game. It's a puzzle game that's also a murder mystery.



It's a puzzle game that's also a murder mystery. It's a murder mystery that's also a puzzle game. It's a puzzle game that's also a murder mystery. It's a murder mystery that's also a puzzle game. It's a puzzle game that's also a murder mystery.





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Select Menu 128

Keep track of everything that's on your disks easily and simply with our menu program

By M.E. Cutley

Select Menu 128 is a utility program written for the C128 plus (340 or 512) disk drive. Written entirely in machine code, the program loads in a basic program. Once the listing has been typed in, changes it has been saved prior to returning so it will overwrite itself, and recover its previous version if not possible.

The program will write a menu on your disk which will display all or any program files on the disk selected by you, each of which can be selected and

run by pressing just one key. When run you will be requested to insert the disk to receive the menu data—the data and name are key. The name of each program file on the disk will then be displayed in turn with an INCLUDE/IN message. To include the program in the menu press Y, otherwise press N. When the final file has been displayed, the menu itself will be saved to disk, overwriting any other menu program on the disk. It will also be run at the same time, so any file can

then be loaded by just pressing the number or letter prior to the name.

If the program is run on a disk immediately after formatting, a file called menu will be saved as the first file in the directory, and can subsequently be loaded by pressing SHIFT/NUM STOP. This program can then be saved as often as required or used when new program files are saved on to the disk.

□□

PROGRAM	SEL	MENU	DATA
PROGRAM 00	00	00	00
PROGRAM 01	01	01	01
PROGRAM 02	02	02	02
PROGRAM 03	03	03	03
PROGRAM 04	04	04	04
PROGRAM 05	05	05	05
PROGRAM 06	06	06	06
PROGRAM 07	07	07	07
PROGRAM 08	08	08	08
PROGRAM 09	09	09	09
PROGRAM 10	10	10	10
PROGRAM 11	11	11	11
PROGRAM 12	12	12	12
PROGRAM 13	13	13	13
PROGRAM 14	14	14	14
PROGRAM 15	15	15	15
PROGRAM 16	16	16	16
PROGRAM 17	17	17	17
PROGRAM 18	18	18	18
PROGRAM 19	19	19	19
PROGRAM 20	20	20	20
PROGRAM 21	21	21	21
PROGRAM 22	22	22	22
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PROGRAM 26	26	26	26
PROGRAM 27	27	27	27
PROGRAM 28	28	28	28
PROGRAM 29	29	29	29
PROGRAM 30	30	30	30
PROGRAM 31	31	31	31
PROGRAM 32	32	32	32
PROGRAM 33	33	33	33
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PROGRAM 35	35	35	35
PROGRAM 36	36	36	36
PROGRAM 37	37	37	37
PROGRAM 38	38	38	38
PROGRAM 39	39	39	39
PROGRAM 40	40	40	40
PROGRAM 41	41	41	41
PROGRAM 42	42	42	42
PROGRAM 43	43	43	43
PROGRAM 44	44	44	44
PROGRAM 45	45	45	45
PROGRAM 46	46	46	46
PROGRAM 47	47	47	47
PROGRAM 48	48	48	48
PROGRAM 49	49	49	49
PROGRAM 50	50	50	50
PROGRAM 51	51	51	51
PROGRAM 52	52	52	52
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PROGRAM 69	69	69	69
PROGRAM 70	70	70	70
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PROGRAM 89	89	89	89
PROGRAM 90	90	90	90
PROGRAM 91	91	91	91
PROGRAM 92	92	92	92
PROGRAM 93	93	93	93
PROGRAM 94	94	94	94
PROGRAM 95	95	95	95
PROGRAM 96	96	96	96
PROGRAM 97	97	97	97
PROGRAM 98	98	98	98
PROGRAM 99	99	99	99

[illegible]

Contributions

So you own a Commodore? So you've written some programs? So why haven't you sent them to us?

Your Commodore is always on the look out for new programs, hints and tips articles and even regular series. In fact if you have something that you think could be of use to other Commodore owners we want to hear about it.

So if you have got something's hot you think we may be interested in. How do you go about submitting it to us?

Below you will find a lot of guidelines that will help us to deal with any ideas that you send us to us. We don't expect everybody to be the next William Shakespeare but if you do follow these simple rules then it will make our job a lot easier.

1) If possible all material sent to the magazine should be typed or printed out on a computer printer.

2) All text should be double spaced, a there should be a blank line between each line of text. You should also leave a margin of about 10 characters around the text.

3) On the very first page you should put the following:

Name of the article
Machine that it is for
Any extra required - disk, printer etc
Your name
Your address
Your telephone number

4) The top of every page should have the following information on it:

Abbreviation of the article title
Your name
The page number

For example, suppose you had submitted an article on CBHardware. You should put something like the following at the head of the page:

Topic: CBHardware

5) Please make sure that you do not make any additional marks on your text especially underlining.

6) Try and write in clear concise English, it does not have to be a work of literature but it must be comprehensible.

7) On the bottom of each page you should put the word MORE if there are more pages to the article or ENDS if it is the last page.

8) If possible, enclose a listing of all programs.

9) Under no circumstances are a couple to hold the pages together. Use a paperclip instead.

10) Programs should be included on either disk or tape. Make sure that you SAVE two copies of every program so that we have a better chance of loading them if problems arise.

11) Programs under 10 lines can be included in the text. If your program is longer than this you must include a disk or cassette.

12) If your article needs any artwork then supply clear examples of what is needed. We don't expect you to be an artist but we do need to see what is required.

13) Photographs, if necessary, must be either black and white prints or colour slides. We can take them ourselves so don't worry about this too much.

14) Submissions of any length are welcome. If you have ideas less relevant that you think may be of use to someone else we welcome it just as much as a full blown article series.

15) Payment varies quite a lot and depends on quite a number of factors, such as complexity of program, presentation of program, number of magazine pages it takes up etc. Payment is generally between £10.00 and £50.00.

16) All payments are made at the month that the magazine containing your article has appeared in print.

17) If we do find your submission suitable for inclusion in the magazine we will write to you giving details of publication, the rate of payment and an agreement form. Prompt return of this form will allow us to use your program as soon as possible.

18) If you want the program returning to you, should we find a reasonable for publication, then you should enclose a stamped self addressed envelope.

19) The last and most important point to make is 'get writing', we are waiting for your articles. 75

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Kids Stuff!

Mickey, Donald, Kermit and Gonzo all feature on US Gold's range of education games. But will you learn anything?

By Margaret Webb

This month's column is rather different in that it deals with a single software house — US Gold. No, I don't have the job at US Gold, but in a way this source of software has made quite a contribution to the software market for younger children.

One important feature to be appreciated is that educational software should be attractive so that it holds appeal to the user as well as delivering the information effectively. This is particularly true in software for children in pre-school and primary age groups. US Gold's software is mostly of American origin and uses Disney and other well known TV characters to help deliver its message. One drawback is that most of the packages require a disk drive in order to function. Whilst disk drives are common in the states, this is not the case over here. These American origin disks have the advantage that they have that extra bit of pizzazz that the American market demands. This also means that the graphics are to a high standard.

The first package is *Donald Duck, a Playground*. This package doesn't set out to teach the particular skills but encompasses a number of features. The idea is to earn money which can be used to purchase items for the construction of an advanced playground for Donald Duck's nephew. The action centres around a street with various shops and other establishments on either side. You control Donald and can guide him over the building of your choice.

There are four money-earning activities to choose from, each using different skills. At the airport, you don't have the ability to match simple shapes or letters as is used. The idea is to pick up packages and put them in the correct holder ready for loading on the aircraft. You are paid for each package correctly sorted and things are made slightly tougher by an on-board time limit.



At the produce market, you must catch fruit being thrown from a lorry and put it in the correct bin. Each time fruit is dropped, Donald gives off a string of quacked expletives in true style. In the toy store, you must select toys and put them on the correct shelf. There is the added annoyance of frequent items which shake tops off the shelves. Finally, you can work as controller on the Amusement railway. This involves the manipulation of points to direct the trains to the required destinations. This task is progressively tough.

Once you've obtained some money, you can go into the shops and buy ropes, ladders, wheel and other parts and construct the playground. At the playground is built, you have the option of seeing the young duck to play or not.

The game does not lack such as letter recognition, matching shapes, speed of response, keyboard co-ordination, forward planning and the handling of money during transactions. All games have their skill levels thereby catering for a wide age range.

Overall, this is an attractive game which gives the impression of play rather than strict learning. Ideal for children from about six to 11.

Another play oriented package is *The Great Game of Words*. This is a sort of takeoff of *Raiders of the Lost Ark* in which the hero, Gonzo (based on the Muppet's endearment to mean Gonzo) the chicken from the end group of the Swedish Chef. Gonzo is equipped with a variety of magic machines by Professor Bunsen Honeydew in the Muppet kitchen of Technology. With these devices, he must negotiate a range of hazards. The child must select the machine most appropriate for the hazard. For example, a diving machine is no use on New York City and a walking machine is no good for walking over the Eggheads. Gonna (from the appalling puns used in the game!) You have a choice of flying, walking, climbing, diving, gliding and rolling machines and a range of attachments such as a number, light meter and water squarer.

To complete the game, the child must score a specified number of

points by negotiating the various boards. The boards are linked so that the game is rather like a long journey or quest. The problems are two-fold.

First the child must select the correct machine and attachments for the particular ritual or, second, the child demonstrates the dexterity and timing needed to negotiate what are effectively a sequence of simple arcade games.

Once *Camilla* has been rescued you manage a few rather higher points tally to achieve. Failure means a long trek by foot across the desert.

Overall the game is ideal for the younger child (six to 11 years) with its combination of fast pace and policy, its simple arcade games and the use of word machines.

Once children start to read and recognise words, the next problem is to teach how words link together to give meaningful sentences. The problem is how to make this exercise fun. One effective approach to this problem is to get the child to write a sentence and then to read it back. *Agnes's Adventure* from Jerry Muller provides a cartoon board method of writing simple stories. A particularly nice touch is that the program uses a joystick to make all selections via cycling letters.

The screen is built up from a series of simple sentences of about half a dozen words. The display shows the sentence at the top of the screen as a series of blocks separated by punctuation marks. You simply point at each block and choose from the words available. Each word is accompanied by an associated sequence showing what each word represents. An example sentence would be: "While the beans danced in space, the new birds "Tee I know it sounds silly, but the program allows unlimited variations. Once the sentence is complete, you can see the sequence described. Once satisfied, you can then move on to another sentence. The sentences have differing



structures allowing a fair degree of variety. Stories can be saved on disk for completion or replaying at a later date.

The sequences are neatly done with back-sound moves appropriate to the scene (all being based on the blip/stop theme song). The sound effects of the characters/objects used are also excellent. Overall an excellent package which gives hours of fun.

The other two packages available are text/graphic adventures. First we have *Mickey's Space Adventure*. In this game, you visit Mickey Mouse and Pluto in their search of the water system for a number of crystal pieces. The game is quite large in that it occupies both sides of two disks.

In two levels, Mickey finds an alien space ship. This means he needs to fly to the planets of the solar system to find the parts of the alien-coded crystal which holds the history of the alien planet. The game uses combined multi-colour mode high resolution graphics with text. The pictures are true to the original Disney characters and are very colourful. The input of instructions has been simplified so that the spaces available are listed at the foot of the screen and you simply choose them using single key presses. The screens are quite large with plenty of places to explore. Clues are also provided, particularly by the accompanying instructions.

On balance, the game is most useful to the older child (say nine to 12) since there is quite a lot of detailed information on the planets and other scientific topics. The accompanying literature is particularly strong with a glossary and ideas for further work. A disk drive is mandatory in order to play this game and the frequent disk changes are rather tedious. On the whole, however, this is a strong piece of software which will encourage some hours to solve. Additionally, each one game is different.

Where the Puck is the Hundred from Wood is very similar in style to *Mickey's Space Adventure* about aimed at slightly younger audiences. The aim of the game is to locate objects and return them to their rightful owner. Naturally, each new game is different. To help players to play the game, a simple map is provided showing the main parts of the wood. This may seem direction which is smaller to those shown on the games allowing you to find out where you are. The game follows quite closely a number of events described in the original books and the illustrations are in themselves faithful to the original. As before, a simple method of selection of options is provided. There are also a number of obstacles, *disenchanters* provided to allow the child to move around. You can, for example, play Puck stunts or look under rocks or count trees etc. There are also a number of confounding factors which can either move you to a random location or shuffle the objects around the wood. In all, good enough to keep a child quiet, or caring (depending on your child) for hours on end. Again, unfortunately, a disk drive is needed.

So what do we have? The packages can be summarised under several features:

- 1) All are colourful, well designed graphics featuring well known Disney characters. They therefore have instant appeal, particularly to the under tens. Sound is also well used to give noise and effects.
- 2) All packages come with detailed and colourful instructions. These instructions also provide ideas for further activities and, where needed, glossaries and detailed information.
- 3) Except for *Donald Duck's Playground*, a disk drive is required.
- 4) All packages teach and test skills without making it obvious. They also achieve their goals as educational packages. In all, the Eds series is filling a large gap in the software market for the primary age group and sets standards which many domestic software houses would do well to emulate.

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Games Reviews

Weird, wonderful, zany or just plain fun. There are hosts of games just waiting for you out there, so we've brought you some to ease the burden of your decision.

KITTLE

Kittle is Tony Crowther's second game since reuniting his partnership with Alligier. The First Thing was featured in *Game of the Month*. Kittle is unfortunately somewhat disappointing.

You play the part of a kittle (hagfish, surprise) and are trapped in an underground complex of 30 different levels. Your objectives are survival and escape. The key to moving from one level to the next is to find a gas opener. This is hidden deep within one of the many bowls scattered round the complex. At first I think that they are bowls. That is what they look like although the Murk insects are eating them bowls but I have a gut feeling that that is wrong somehow. Shooting the bowls 30 times results in a changing mix of a divided and a further successful hit changes the demand into a close a button, an strategy involving a lot of water as the much needed gas opener.

Shooting objects — barrels, bottles and diamonds is done by use of a cross. This offers around your foot le and behavior, resembling like a cross between a South American Joke and a yo-yo. You can choose from the usual open screen how you wish the music to behave.

The most interesting part of the game is the fact that two players can play simultaneously. The screen is split so that we can watch exactly what your opponent is up to. Two distinct strategies present themselves. You can work as a partnership or you can play against each other, waiting for

the other player to do all the hard work before rapping in and snatching whatever the destined happens to reveal.

The split screen works really but the main problem is that the game is just plain dull. Not one of Tony's better efforts.

G R E

Timeless.

Pole Agency Company, Albany / Owners: 10, Sheffield, Mass., Cost Price: £8.45, Originality: 5/10, Graphics: 1/10, Playability: 5/10, Value: 1/10.



UCHI MATA

Among the plethora of karate and kung fu combat games, it is a pleasure to see something a bit out of the ordinary. Such a game is Uchi Mata, a judo simulation. The name is definitely wrong in one of the moves — an uchi mata is a throw.

Judo allows no kicks or punches, it involves gripping your opponent's gi, pushing him off his base and trying to throw him onto his back. How well you do this results in points being awarded to you. A perfect throw is called an ippon and immediately ends the bout. Lesser maneuvers may be awarded a wazari, yuko or koka.

Your chance of completing a successful throw depends largely on the quality of grip you have on your opponent. When you are in the starting crouch a quick press of the fire button makes your arms make a grab and a bar chart in the top left hand corner displays the relative grips of the red and



what players, together with their respective strategies. A successful throw can only be made if you are attently watching to another part of the button lights as an indicator to decide who is the Turn (determined by any previous movement). The throw itself depends on a specific sequence of joystick movements. Some of these are outlined in the instructions, others you must discover for yourself! The different throws include a tournament (sacrificial stomach throw) and a side burn (advancing while moving). There is a precise mode for you to go out three moves before you go into actual competition.

The thing that struck me most about *Uchi Mats* was the amount of realism that Marack have tried to include in the game. It is not a serious packed away Way of the Exploding Fist but more subtle and unusual. You will realise if you are coming to grips with your adversary. **G R H**

Machine

Rule: Uchi Mats Company, Marack Bay Terrace, Pinner, Middx. Tel: 0181 834418. Price: £7.95. Compatibility: AT/XT, Graphics: VGA, Playability: 3/10, Value: 3/10.



150

As might be guessed from the game's title, *Uchi Mats* is a game simulation. And it's not a ball one either. The object of the game is to win the championship. There are eight competitors, playing in arenas such as *Reds Uchi Mats Shin Saburo* and *Luap Woon Lee*. You can meet any of the players as you progress from the quarter final but the final is where you square January Joe.

The match itself is the familiar 20", straight in, double out, a match being the best of three sets. When it is your turn to throw, a hand appears in front of the screen. It moves about slightly as you aim, so that you can't move directly to the table (and it's all the time). To further complicate matters, the diagonal movements of the joystick are effective. The result of all this is that winning the single 100% knockout is easy as it appears when the expert does it on the box. Every time you throw a dart, your current score is drilled up on the blackboard. Then you must go back and watch your opponent throw. Each of the competitors has his own preferences and qualities but it is up to you to work out what they are.

The game is full of nice additional touches. You can practise before the match in a game of round the clock. The numbers 1-30 must be hit in rows without missing a hit line. There are some automatic back drops as your opponent throws and should you have difficulty working out exactly which numbers you have to hit in order to finish, there is one of the more popular conversations on the cassette cover.

Most of the snippets in darts games released up to now have been fairly poor and I think only the pick of the bunch for watching these long hours when the pub is closed. **G R H**

Trendline

Rule: 100 Company, Manchester. 1-10. Price: £5. London: £2.14. 400. Tel: 01 477 6600. Price: £2.99. Machine: C64. Graphics: AT/XT. Graphics: VGA. Playability: 3/10. Value: 3/10.

SUPERSTAR PING PONG

Superstar Ping Pong is a table tennis simulation with enough options to provide a challenge for even the most demanding players. The ball is suspended in mid-air and moves rapidly in the direction of the ball every time the first button is pressed. Sounds too easy? That's what I thought until I lost the first two games 21-1 and 21-2 on the slowest possible settings!

Timing is crucial if you are to succeed in returning the ball over the net. Assuming that you actually make contact in the first place, the ball can leave the bat at any one of eleven different angles. Initially, it seems that there is only one angle — one that sends the ball miles off the side of the table. The trick is to get the bat in position early rather than late. Once you get used to returning the ball, then you can start to work about where on the table you want to put it. Your second shot is top spin but you can switch on when the ball at you's any so.

Before you even start to play, there are three pages of options, but you can select from. You can play either against the computer or a human opponent. If you choose the latter option, you can first to have the table from side on (instead of the more normal and as position). There are three speeds which appear to different skill levels and you can also opt to let the computer move the bat for you — very useful when you first start.



The standard of your game is measured by how different abilities ranging from forehead and backhand skills to speed and endurance, and these can be adapted to suit your selected profession. Finally, some choices about the length of the match and ball colours.

Once you get used to controlling the bat, *Superstar Ping Pong* is a more relaxed, unalarming. The number of upcommers that you can shoot is set up a variation whereby the computer is just that little bit stronger than you are. There are also some more subtle touches. It's not restricting to know that the computer is capable of mistakes as well as you and is just as likely to serve the ball straight into the net. Well worth considering if you enjoy reaction games and want to get even more shots on target for a bit. **C B J**

Football

Title: *Superstar Ping Pong* **Company:** US Golf **Units:** 2/3 **Reford:** Wm. McEld **Screenplay:** 66/68 **Ref:** 031 439 119 **Price:** £5.99 **Version:** £14.99 **disk:** **Graphics:** 4/10 **Sound:** 3/10 **Playability:** 5/10 **Value:** 5/10



SANMOR

P... Pilot here. Just taking a break from training exercises to let you know that it looks as if we're getting those alien under control. What do you mean you don't know what I'm talking about? Look, you know we almost had a nuclear war a couple of weeks ago! You know it was only stopped by the fact that the aliens turned up determined to wipe us out because their thing we're not intelligent to colour the Universe? Well, now, they're even young guys like me to sort out the little bighorns.

There's wave after wave of them, all different shapes and sizes and they are totally useless! man, you just have to keep on firing at them. I've not got fuel in the tank but when they get to know you're a firm to be reckoned with, they send in the big gun. Wave-shaped in all, which goes around and fairly make you dizzy.

Seeing the world from my ship is a pretty unbelievable experience too. Survival silver landscapes, dark, creepy, swarms and only open mode of origin faded. And some some of the alien are really high tech. They've got delicious which are left to periscope. And have you ever flown through a window? That's an experience not to be missed.

They're looking for thousands of triceratops to control the millions of alien now running the planet. Why, don't you sign up. You'll never get another chance like it! **Panama.**

Football

Title: *Superstar Ping Pong* **Company:** US Golf **Units:** 2/3 **Reford:** Wm. McEld **Screenplay:** 66/68 **Ref:** 031 439 119 **Price:** £5.99 **Version:** £14.99 **disk:** **Graphics:** 4/10 **Sound:** 3/10 **Playability:** 5/10 **Value:** 5/10

PANTHER

The city of Kansas is under attack from the usual hordes of alien invaders. You are the last remaining pilot in the Federal force and are trying to rescue the few survivors and struggle until left in the city. The fact that the enemy now occupy large chunks of the city and will come at you with everything they have got, should prove to be only a minor hindrance.

The game is a diagonally scrolling shoot-em-up, reminiscent of *Zaxxon* and *Blue Max*. Your Panther drops in from left and right, up and down as you fly over the landscape. Starting in the desert, you must fly over a large lake before reaching the city itself and spacecraft beyond. The survivors are hiding in bunkers and red signposts and you must land inside in order to pick them up. As you are constantly under attack from different waves of aliens, the chances are that you will have to make several runs through the area - a trait that the computer will return you to the appropriate position. As you near the city, the enemy under will look on to you unless you can fly at every low level dodging buildings as you go.

Panther is not a bad little game, especially at the price. The control required to handle your craft should give even the most ardent arcade fan a good run for his money.

Football

Title: *Panther* **Company:** Microcomputer 4-10 **Ref:** 031 439 119 **Price:** £5.99 **Version:** £14.99 **disk:** **Graphics:** 4/10 **Sound:** 3/10 **Playability:** 5/10 **Value:** 5/10



ANTIRIAD

After the inevitable nuclear war, and the horrendous nuclear winter, the numb begins to recover. From the chaos has emerged a new race of man. Strong, brave and hardy, but peaceful and simple too. The only shadow over their lives is the super-volcano surrounding the ancient city, half buried at the foot of a volcano.

Suddenly, from the sky appears a strange peril. An alien race, ruthless and bloodthirsty, attacks hundreds of a simple people and put them to work in the mines. They make the ancient volcano their headquarters and the fortress of their power source.

But the rising race does not give up hope. Secretly they start raising hells to seek revenge and save the race. One by one emerges. Till, one day, into the heart of the volcano to find the ancient world of man once ready to start rebuilding itself and wishes to move, destroy the power source at the heart of the volcano.

The first thing to do is to get through the layers, ascending the many mine-piercing bugs which block them, and reach the enemy. When you get to it you'll find that you need not a gun, but a bomb and a blaster. So you have to get out of the entrance and find the bombs which await the top of a tree, then get back to the wall and floor where to find the blaster.

All of this involves no useful lot of death destruction, mainly let you remember when you're not in the cut with some blaster, the only way you can kill anything is by shooting rocks at them. However, you're not used to as they're huge for you are.



On the whole it's quite a nice game, graphics are reminiscent of Castles II, and a lot of fun and interesting. It's also very difficult so you'll need quite a bit of practice especially to get the hang of that floating bomb when you're managed to get the car on the gas. Make sure you pick up lots of power-ups as you go about, though because if you run out the car dies and you have to get out. That's not one it was to deep in the volcano?

M.C.

Touchline

Title: *Touchline*, Company: *Pacific Software*, 171 Portsmouth Road, London W1, Tel: 01 278 6711. Machine: C64 Price: £14.95. Dependency: 8/70. Playability: 1/70. Graphics: 1/70. Value: 6/10.



MARBLE MADNESS

This one is a strange game from Electronic Arts, one of the makers of Amorphis. You're a marble, and you have to negotiate various 3D mazes. The problem with being a marble is that it's very difficult to control our movements. A guide shows you the joystick to the left and you had yourself clanking off the edge of the play area into an abyss.

Level one (of sixteen) is a very simple maze and it was to work your marble hanging around a bit rather than just to get the hang of the controls. Each level has sixteen mazes, level two is a very good level like marble like a champion born to lose on a world!

To be honest, I couldn't really get addicted, although I know people who are. One of the main reasons for this is that each level loads separately from disk and this seems to take an awfully long time. The apparent reason for this is the sophistication of the graphics and sound. The graphics are really wonderful, with beautiful colours and very effective 3D landscapes.

In order to avoid getting stuck, marble using some 'rocks' which are black marbles which try and push you off the edge. You have to be careful if you get them free. There are various obstacles which work you off course and plenty of traps and things to send you spinning into oblivion.

It was like a game which is totally frustrating and very different than the many keep you engaged for hours even if it's only to stare at the fascinating picture. Definitely worth a try.

M.C.

Touchline

Title: *Touchline*, Machine: *Company*, Touchline 68 Long Arch, 11111, London, London W1, Tel: 01 278 6711. Machine: C64 Price: £14.95. Dependency: 8/70. Graphics: 10/10. Playability: 7/10. Value: 7/10.

M.C.

BOBOBOLT

They say that innovation is the essential force of history. If that's the case, then Andrew Braybrook should be looking very flustered indeed. Bobobolt is, in yet another example of a Pinball game, Undreamt was the sort of game. For my money, though, this at least has not succeeded half as well as some recent releases.

The basic principle behind the program, is to collect Death pods, place them in the assembly area, then switch you to swap to the next level. There are four pods to collect on each level. The only trouble is, they have to be collected in the correct order, otherwise they will be rejected. Well, you are running around, trying to find the pods, your energy is decreasing rather rapidly. Energy can be maintained by shooting the alien no-man-around, (don't get level as far as I can tell). To add to your troubles, you have a ready time counting down, which seems to be in permanent turbo drive.

The joys that I received had no sound at all (except for an opening narrative). The control of your ship is somewhat tricky also.

All in all I found this program a little muddled and underwriting for my liking but at £1.99 what's complaining?

P.E.

Footnote

Title: *Bobobolt* Company: *Alpha/Design 2 Kings Yard, Coppenhall Road, London E11 2ND* Tel: 01 551 2818
Machine: *CDI Pin* £1.99
Originality: 4/10 Graphics: 5/10 Playability: 4/10 Value: 4/10



ORPHEUS IN THE UNDERWORLD

After playing *Orpheus in the Underworld* for quite a few hours, I'm still not sure exactly what you are supposed to do. Obviously your task is to get out of Hades. How you do this is a mystery. Created you can collect treasures on your travels, just how this helps you, though, is not clear.

The game comprises of lots and lots of screens (well actually it's just one screen with a few different things in it each time).



To get about, you have to jump over pits, swing from ropes and use charms. The one really novel idea in the game, which I personally found a bit annoying, is that the music only plays if you are moving. Stand still and the music stops and also.

The backdrops are somewhat confusing. I was always under the impression that the underworld was Hades, not the inside of an Egyptian tomb (well not here and there).

Not wanting to see all gloom and doom, like the door does have a hole of the clouds, 'I must just have one more go' about it.

P.E.

Footnote

Title: *Orpheus in the Underworld* Company: *Alpha/Design 2 Kings Yard, Coppenhall Road, London E11 2ND* Tel: 01 551 2818
Machine: *CDI Pin* £1.99
Originality: 4/10 Graphics: 4/10 Playability: 3/10 Value: 5/10

COMPUTER HITS 3

Companion tapes are all the rage at the moment and *Computer Hits 3* is one of the better examples of the genre, offering 10 different titles. The emphasis is heavily on action and, while some are good, none of the games are really staff.

First off the block is *Orion's Strongman Challenge*. A training session allows you to build up certain muscles before going on to compete in events such as barrel racing, longjump and some wrestling. *Eladon* is an arcade adventure in which you play a hero trying to find princess and flowers in order to make a garland for the Queen.

Blogger goes to Hollywood when you trying to break out 13 different stars with assorted props in an attempt to gain access to *Spotlight's* office and start a film. *Crashdown* puts you in the part of a witch trying to rid the land of the evil paragon and thus becoming the witch queen. The first tape ends with *3D Laserblast*, a mix of strategy and shoot-'em-up as you try to protect your base from the invading *Scorblis* forces.

Still one of the more popular games in the office, *Crashdown* can highly attract in shoot-'em-up in which you blast

platform before they turn into superheroes. Dynamite Dan is a platform game in which you must find eight stars of dynamite with which to blow up the talk of the evil Dr. Blaine who has plans to destroy the world. Herbert's Dream is set in a toy street with young Herbert trying to find his lost parents and saving silly babies as he goes to keep his strength up.

Attack of the Mutant Cretails is one of the first games that I ever played on the 64 and it still a classic blast from the past. What else could it be but a Jeff Minter game with a name like that. The final game is another arcade adventure. The Adventure of Bond - Bonkers Bond, based on the classic Aladdin character. The object is to smash jokes with punchlines as you attempt to rescue Ron who has been kidnapped by a cruel comical cat.

None of the titles are theories of games where you think "I must have this", but they are all average plus and (I figure) for the money must represent good value.

G R H

Touchline

Title: Computer Arts & Company: Bonafide, 264 Red Street, Romsey, Surrey RM2 1AD. Tel. 01753 23081. Machine: C64. Price: £9.99. Value: 3/10.



STRIKE FORCE COBRA

Be warned, Strike Force Cobra is not a game to be completed in one sitting. This program will only be mastered by constant struggle and patience on your part.

The principle of the game, is to destroy the main computer of the enemy, before he blows up the entire world. To do this you pick a team of four superheroes, from a list of eight. Each of you takes on a mission in one particular field. It's up to you to select the best team for the job. Once your team starts its mission, control of each machine is selected by simply pressing the corresponding number key (as two will make number two here under control).

The computer is represented as 3D style, therefore movement takes some time to get used to. There are numerous obstacles to overcome. Illustrated pictures plus,



colours, varied graphics, locked doors, value increases to name but a few. How you overcome each obstacle is a matter of trial and error.

There are some good sound effects used within the game. The only real criticism is the method of controlling/using your main (hand weapons of laser, F-bugs and physics). I always have difficulty remembering what does what.

For people like this, taking, managing and generally enjoying (wow - with many) as well therefore is a must. The purposely not read too much about the game for fear of spoiling it for you. Go out and buy it.

P E

Touchline

Title: British Space Colour Company: Frontier 4 Little Street, Surrey. London WC1R 1LF. Tel. 01-461-6615. Machine: C64. Price: £9.95. Originally: £7.95. Graphics: 2/10. Playability: 3/10. Value: 2/10.

ACE OF ACES

The Mustang was one of the great contributors of British aeroplanes during WWII, together with the Spitfire and Lancaster and was definitely the most versatile of the three. Very fast and manoeuvrable - it was used in both offensive and defensive roles. Ace of Aces puts you in control of a Mustang and gives you the chance to try your hand at several different missions.

You can choose to fly on just one or a combination of missions from those available for selection. Possible targets include V1s, U-boats and tanks. An intelligence briefing gives you specific target locations together with weather details and you must then arm your plane. Depending on what you are trying to hit, you can choose from rockets, bombs and cannon. You should also fill up with fuel at this stage.

Once you have taken off (done automatically) you have total control of the plane. Two joysticks, pressure on the fire button and you can move the joystick to select pilot, navigator, engineer and bomb aiming functions. The navigator screen shows a map of you in relation to your targets. Bomb-aiming involves opening the bomb doors and

—choosing the appropriate weapon or sword are fast tasks. The screen screen shows the view over the left or right wing and you have access to throttle and flap control as well as a fire computer should you want off around last in a dog fight. All the different functions are controlled by moving a marker to the appropriate dial or switch. There is no manual of keys to try and remember.

The main part of the game is obviously with you in the pilot's seat. Again, there is really a fire dial for you to keep your eyes on — airport, a distance, compass and radio being the main ones. The only real problem comes when you are in battle. It is all too easy to get overwhelmed and panic the fire button when it, quick succession which promptly takes you on to a different screen.

The last part about Ace of Aces is that, unlike other flight simulators it is very easy to get into. This does not mean that it easy to play, far from it, but there are practice modes to let you get the hang of things. Other nice features include the use of closed which you can't see a thing and the recording of many points if you hit the wrong targets so that you can't just go on blasting everything in sight. All small, a very well thought out and highly enjoyable simulation.

G.R.H.

Franchise

Title: *Ace of Aces* Company: *US Gold* Caste: *1/1* *Midford* *Box* *Midford* *Birmingham* *86* *UK* *Tel* *011 335 3344* *Machine* *C64* *Price* *£9.95*

Originality *8/10* *Graphics* *8/10* *Playability* *9/10* *Value* *4/10*



TRAPDOOR

Based on the children's TV series of the same name, The Trapdoor stars a large blue, snailly character called Berk who is responsible for the welfare of a busy town of work known only as 'an upstairs'. The Trapdoor in question is situated at the bottom of the castle and contains a whole mass of the most horrible monsters imaginable who, besides to say, always manage to get out whether by accident or design.

In the game, 'an upstairs' has decided that he wants



leading snail-like Berk to connect such differences as a sign of worms, beetles, slugs and eyeball casts. The various bits of equipment needed are to be found frog around the various levels but Berk also needs to open the trapdoor and let out one or other of the monsters to eat him in his track. For example, to fry the eggs, Berk must first release the bird and find some way of making it lay the eggs before he can collect and cook them.

Objects can be picked up and carried and tipped up to avoid their contents. Levels are opened just by standing next to them. The attention to detail is excellent both in the operation of the characters and the methods necessary to produce the dunes. You have two so called friends to assist you. These actually will give you a clue if you push them apart. Darts, a small beauty creature seems more of a hindrance than a help. He loves eating the worms that you are trying to catch. The solution lies in finding some way of avoiding him, to fall down through the collar.

The game's graphics are extremely large and colourful but they do suffer from a rather problem. I know what you are thinking — if you wanted these, you would have bought a Spectrum and what makes the full view more better to make it so that the Spectrum version doesn't suffer from the problem? But this is only a minor hiccup in what must surely be one of the most original and enjoyable games of the year.

G.R.H.

Franchise

Title: *Trapdoor* Company: *Frontier* 4 Little River Street *London* *WC2R 1LF* *Tel* *01 833 8631* *Machine* *C64* *Price* *£9.95*

Originality *10/10* *Graphics* *9/10* *Playability* *9/10* *Value* *8/10*

CYRUS CHESS II

With all the interest of the recent World Championships between Garry Kasparov and Anatoly Karpov, it is not really surprising that there should be a corresponding interest in chess programs. Cyrus II is one of the better programs around, both in ability and presentation.

The game's presentation is what struck me most about the Cyrus II. The pieces are large and clear and easily



disappointed, something that cannot always be said for other chess programs. Moving a knightly staff. Select a piece with the cursor and it changes colour so that you can see whether the piece you have selected the one that you wanted. Similarly when you select the destination square. There is no need to bother with algebraic notation or F&K or whatever. If the computer wins a computer input is a hint as to you are trying to make an illegal move.

Pressing the space bar brings up a list of options as well as details of the moves made so far. You can set to move back (based on your), change the computer's skill level, swap sides or even set for a hint. Positions can be set up for problems, solving and there is a demo mode if you get fed up of losing games.

The crucial question when it comes to considering any chess program is how good it is and whether it is almost impossible to answer. For the beginner or someone who is out to improve their game, any program should suffice. The program is to set the skill level just a little bit better than you are. For the more serious player, Cyber II will provide a strong challenge although you would ideally need to try a few games to learn its subtleties against yours.

But for the majority of players, Cyber II makes an ideal opponent and should be high on your list of programs to consider.

G.R.H.

Touchline

Title: *Cyber Chess II*. Company: *AtGames*, 1 George Street, Sharnfield, Macclesfield, Cheshire, M24 1JH. Price: £10.99. Originality: 3/10. Graphics: 2/10. Playability: 2/10. Value: 2/10.

Fist II

After all the hype, *Fist II* - the Legend Continues has finally hit the shelves. The original, you may remember, was the first of a plethora of martial art games. Why of the Exploding Fist was a straightforward karate simulation, you trying to knock bits out of your opponent before he did likewise to you. In this sequel Melbourne House has kept the same combat ideas but transferred the action to no-nonsense adventures.

The scenario is that the Warriors of the Exploding Fist have been betrayed over the centuries and the Last is, now under the rule of the evil Wizard. Nobody has seen his fortress but plenty of rumours exist, featuring volcanoes and a deadly ice labyrinth. The fighting warriors of the Masters are supposed to be hidden somewhere on the land in the form of scrolls and there are shrines and temples to be found where an aspiring warrior can meditate and seek guidance. Such a place is you. Although usually weak and inexperienced, the elders hope this will provide the necessary talent to overcome your ultimate adversary.

The scrolls that you must find contain knowledge in the form of weapons. The secret is to match the weapons with the appropriate temple and then learn its secrets. For example, Chi is associated with swords and Tai is associated with spears. A scroll of well being when surrounded by malignance. Temples are also important as they contain vital energy and that you should you be possessed.

There are a variety of foes for you to fight ranging from simple but aggressive monsters to mighty dragons and deadly assassins. There are also creatures of the wild to be faced: snakes and monsters etc. The action takes place in a variety of locations - islands, in buildings and caves and even in water. This last location is tricky as not all your moves are defensive here. Movement is only from side to side but there are pits to fall in and ladders to climb. The only annoying part of the game is as you move round, a map for the next screen is shown too up - you move off one edge and then action is suspended as the next one scrolls past you.

The idea of a quest rather than just straight combat works very well indeed as there is the added reason to have just one more go and find out what is behind the next screen. It's a bit of a pity, though, your task will not be easy and you will have to do really well before the wizard even takes notice of you. Fortunately, you have the option to practice all your moves beforehand. Side two of the tape contains a training mode. A nice touch from a game designed to beat the sheets.

G.R.H.

Touchline

Title: *Fist II*. Company: *Melbourne House*, 40 High Street, Hampton, Wilt. *Remington-Union, Surrey*. RTT 40R. Tel: 01 263 3511. Machine: C64 Price: £10.95. Originality: 3/10. Graphics: 2/10. Playability: 2/10. Value: 2/10.



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BBC
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Abstract

[illegible]

These individuals are paid, therefore, according to the cost-benefit approach. The authors conclude that the cost-benefit approach is a useful tool for analyzing the economic impact of a policy. The authors also note that the cost-benefit approach is not a perfect tool, but it is a useful one.

Micro Clerk

JCL's combined Wordprocessor, database, spreadsheet and book-keeping package is just what small businesses have been waiting for.
By Stuart Cooke

Small businesses would quite often benefit from the assistance of a small computer to help them keep track of their books etc. However, when it comes to purchasing a machine many people are put off by both the cost of the computer and the actual cost of the software.

To overcome this problem JCL Software has produced an integrated small business package that will run on what is a relatively cheap computer (ie, Commodore 128, called *Micro Clerk*). *Micro Clerk* will handle most of the paperwork that a small business will require including typing letters and documents, filing information and releasing it, producing conditions, contracts and probably most important book-keeping including profit/loss and VAT returns. The package doesn't even stop there it goes on to provide such things as calculations, note pads etc. The main of the later.

How It Works

Micro Clerk comes complete with two disks: a manual and a double. In one you have a set of hard of a double this is a small memory device which plugs into your computer in the rear the parallel port. The program will only work if this double is in place. This means that you can make as many master copies of the software as you require, but can only use them with the double.

The manual is clearly written and put together in such a way that even a complete novice to computers will be happy using the software as it is. It contains all getting to know it, then it gives a brief overview of the



package and then it's over to you to learn and use for yourself. Such as telling you that the letter 'I' and 'l' cannot be used either of the numbers '1' and '0' as they are, on many operations. The simple look of the manual is lightened even further with small cartoons and pictures spread around the documentation. All of course discussing some very important points such as keeping your files away from your disks.

Floppy disks are dealt with in detail and a clearly explains what you can and can't do with them and the fact that you need to back up your software for security is constantly repeated. In fact the software is written in such a way that it is impossible to use the disks that are included with the package. As soon as you LOAD them into your computer you are whisked off into the backup section of the

program and then you're copying the disks.

As I have mentioned the software is supplied on two disks: that means that a certain amount of disk swapping is involved even if you have two drives, one for the software and one for your data disks. However, it was once a DOS then it is possible with all of the software (more that a book means that you could have it on the drive). JCL has said that they will produce single disks versions of the software for people who want them.

Training

When confronted with anything new it is usually advisable to go on some sort of training course to learn all about it. *Micro Clerk* comes complete with a five minute Training guide to



types and filing which will get you used to the package and some of its capabilities.

Upon loading the program you will be presented with a (welcome board). Here you will find any message that the program may have left for you. An alternative function lets you set up today's date and use within the program while the, Diary function allows you to look at the selected monthly appointments, holidays, etc.

Once you have finished with the menu, there you can return to the main menu. Here you can select at the point of a key the following options:

- Accounts - the book keeping tool, point typing
- Filing - for documents
- Schedule - for workflow forecasts
- General - Altering screen colours, company name etc
- Backup - Copy to disk
- Close Down - Finish for the day and exit subprogram

One alternative menu function is the ability to pass the HELP key at any time. Should you press the key while on the main menu, a help screen similar to the above is given together with where you can find more information within the package. When help is

selected you are also given the chance of printing the help screen out and editing the screen.

Program Features

Should you select typing from the main menu then the computer will go down and load the Wordprocessor from disk. Again you will be presented with a menu of options, as with the main menu. These are:

- Edit text
- Load from disk
- Save on disk
- Print on paper
- Clear window and
- Destroy text file

I think that all of the above options are self explanatory and therefore need not be dealt with in main detail.

The wordprocessor isn't as flashy as some of the dedicated wordprocessor programs that are available on the market it does however offer a few "new" features which make it both pleasant and easy to use. Options available to the user are as you would expect, inserting and deleting of lines and characters an automatic error that allows you to add text in the middle of text already entered. Unlike with a typewriter the only time that you are required to enter a carriage return is when you want to start a new line such as at the end of the text. The program has an automatic word wrap which will prevent the rest of the paragraph from appearing on one line.

The find option allows you to search any word in the text making it easy to move around the text.

The block function allows you to delete blocks of text from your results as well as print them or move them elsewhere.

If you are lucky enough to own a printer that supports such features as Underline, Bold or Star Letter Quality, then you can make use of these. The setup screen version of the program allows you to customise the program for specific printers.

A couple of noteworthy new and not yet known to this word processor are the "Star" and "Frame" commands. Whenever there are found within a document the program will automatically insert the current date, instead when loading the program and the name and address of your company.

For companies who have large

mailing lists you will no doubt find the mailing option of use. This will allow you to insert information within your text that has been retrieved from the database. For example the name and address of all your clients. Provision is also made to allow you to enter a merge list, the information in the merged text is then from the key-board which is useful for those one off letters. A number of advanced features are included here which allow you to perform calculations on information before it is entered into the letter you can even set the number of decimal places that are used when printing numbers.

All in all the wordprocessor is excellent for producing small documents or letters. As I have said none of the fancy features available with larger wordprocessors such as spellchecking are present but it will make making out letters on much easier.



General Notes

The database or filing section of the program is almost non-existent, storing information such as names and addresses or names is easy.

For those of you who may have never come across a database it can be viewed as a type of electronic card index box. As with the cards you can delete what information that you wish to store and in what format you want to hold it. However a database is much more flexible. Let's use for example that you have a list of club members stored under their surname. The file may contain their name, address and whether they have paid their subscription.

Now let's say that you want a list of all people who hadn't paid up. With the card index system you would have to go through each card in turn looking out the people who hadn't paid. With a database then you could ask it to give you a list of people who hadn't paid



and it would do so almost immediately. Further more you could then get the computer to print out a reminder letter to them with the address they owe complete with their name and address in the relevant parts of the letter.

Defining the layout of your file is a relatively easy. When you design the way that it is going to look, you can specify that particular entries must be set, numeric only (such a line on claimed places) or a date field. Once a database has been set up there are no problems saving it into any order that you require, for example you could produce a list of people who live in London in alphabetical order. It is even possible to put several different conditions that must be met. For example you could ask for a list along the following lines:

A list of all the people living in London whose subscription has not cut.

As you can readily appreciate this is much easier than having to do it by hand.

When printing the information from within Micro-Club it is possible to select REPORT format or LABELS format. The REPORT function allows you to print a report with up to eight lines given out to each record. You can decide how you want the printed to be laid out and the fields that you require printing.



Labels - in this file option, allows you to print out the information stored within Micro-Club on to self-addressed labels. Each label can have up to six lines printed on it and up to three different fields. You can print either one, two or three labels across the paper.

Spreadsheets

A spreadsheet is of use to anyone who has to produce a lot of related information.

Take for example a forecast on the condition of a company. Usually these forecasts are produced on large pieces of paper with rows and columns. Specific information is placed into the gaps remaining. These calculations are carried out on either the rows or columns to show totals.

The computer screen of this is called a spreadsheet. The screen acts as a window over the larger spreadsheet allowing you to see specific portions of your data. You can type, headings, figures, and formulae into any location on the sheet, then once the data has been entered you can perform calculations in the rows or a column.

The spreadsheet offers all of the usual facilities associated with such a program. As with all the programs in this review the use of the program is clearly explained and you should be able to use it without too many problems.

Cash Book

The cashbook will probably be the most important part of the software package. It allows you to simply type in details of everything you buy and sell. You have the option of doing this each day, or even five-days, as long as you keep the information accurate and as up to date as possible. At the end of each week you select the END OF WEEK function which will automatically print out a list in the form of double-entry account book pages of everything entered during the last week. Even income things such as VAT are taken care of.

The facility exists to produce Profit/Loss reports at any time showing months, where you are spending most money, and how much you have spent this year.

As with all of the programs in this package you are presented with the various options when the program starts. Available to you are:

Enter - which allows you to enter details of income payments, bankings etc.

Print - allows you to print out lists of all information entered.

General - Setting up the cash book.

Headings - This allows you to alter the various headings and print out various types of reports.



Bank. The first feature is that you can select to work on a monthly basis should you prefer.

Setting up the program to run your own business is extremely easy. All of the headings being under your control. The only slightly confusing thing is that you must give each heading an analysis code. These codes must be in the range of 100-999 as well as these being special group codes then. For example today heading as 00 are sales group codes. You can of course print off a list of headings and codes as you wish.

Should you choose the entire operation of the program then you will be asked what type of entry that you wish to make to the system. Options available are Receipts, Bankings, Payments, Transfers and Standing orders. All of which need no further explanation.

At some stage within the program you will require prompts of specific details from your cash book. All of the following are available and will so should keep you a constant supply for quite a while.

Bank Trial - A list of everything that you have entered the last week.

Sales Report - A report of each sales and any other income.

Sales Analysis - A list of the total sales of each heading for the current week.

Purchase Report - A record of everything that you have purchased over the last week.

Purchase Analysis - Total purchases for the last week under each heading.

Money owed - A list of all money received or paid out by the business during the last week.

Bank Report - All entries affecting your bank account.

Transfer - A list showing all transfers you have entered during the past week. It shows that is what accounts you call a National Journal.

Stock by Value - A list showing a summary of each stock group and its value.

Day Analysis Rates and Purchases - A list of all sales or purchases for each day of the week.

Ending - This shows all Sales Purchases and Expenses during the period, and then produces a calculation of your Gross and Net profit.

Balance Sheet - A balance sheet for your business.

VAT Report - A VAT report can be printed at any time though you only need one when you are required to fill in a VAT form each quarter.

That just about covers the main book operations of the program. As you can see, I don't see it as extremely comprehensive and obviously no easier to use than a number of books. The number of different reports that can be produced should be fairly handy, but your accountant might find quite a few more.

Sets and Prices

I have covered the main sections of the program above, however there are quite a number of smaller but very useful features available within the program. I have already mentioned the use of the HELP key and that it gives brief descriptions of whatever you are doing. Together with the page number of what to find more information on in the manual. As well as the help key many others have functions.

F1 will allow you to access the programs disk. **Function** From within this option you can Display the files on the disk, or the drives that are relevant to the version of the program you are using. You can press a bit below all the files should you require. **F10** Space will tell you how much remains left on your disk and you can format new disks when the need arises.

F2 calls up the printer options. Here you can set the size of the paper that you are using, tell the printer to move to a new page, check that the printer is on-line and ready to use.

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Page Pause will set the program up so each time you press the previous and pause after each page, this will allow you to use single sheet paper.

The **Printer Test** option is quite an oddity, although quite useful in the program can be forced to produce all printers to the screen rather than to the printer.

The **Locked** key at the top of the keyboard can be used at any time to move the paper up one line in the printer.



Function Key F3 gives you access to what is probably one of the most useful facilities, that of the electronic journal.

Electronic journals allow you to use all or part of the screen as a form of notepad. This means that you could take telephone messages, notes etc and place them in a journal, just as you would do with a writing pad. The contents of a journal can be recalled at anytime and reproduced on the printer.

The journal can also be used to 'capture' whatever is on the screen when the F3 key is pressed. This means that you can copy the screen from one program, then using the paste function you can then place this information into another program. For example you may take a record from the database and then paste it into a word-processor file. **Function key number 4** allows you to set the date, call up a calculator, handy for quick calculations, and use the printer as a typewriter, or you can type directly from the keyboard and then send it to the printer.

A diary is available on the F5 key. This will display a calendar for the current month on the screen. You can then set up a diary page for six months allowing you to set up appointments for the month etc.

Should you ever require a copy of the screen the F6 will provide you with a copy on the printer.

While you are in the accounts

mode of **After-Clock** you can examine any Analytic Heading change the VAT code etc. This allows you to post interest income to the interest of money on your Bank Account, or how much money is owed to you.

Verdict

Because this package is so comprehensive it is impossible to give you more than just a taste of what it can do. The package is continuously being expanded, with new modules becoming available all the time. I believe I have not covered Sales Ledger and Purchase Ledger programs that can be used with the program.

Because of the complexity and versatility of the program it is being given to an accountant used to someone who is just setting up a small business to use as a practical application. I hope that in a month or so it will be able to report these features to the program together with more details about the Sales and Purchase Ledger.

Amstrad and Alan Sugar have made a killing in the small business market with their range of small business computers that cater complete with software. After Clock is superior to that supplied with these machines and I am sure that the C128 and Commodore would have and may still, get a larger share of the small business market if that software was given away with the machine. Don't start it is possible to purchase a complete C128 system with two disk drives and a printer for under £1000 this product is well worth taking a look at.

Conclusion

CompuLink Ltd / 10 Rivers Road / Wotton Clary, Warwick CV35 9JY / 02471

JCA Software / 1 Shipfield Road / Southborough, Tonbridge, Kent TN11 5PD / Tel 0432 51316

Form for VAT / Manual £69.99

Accounting Packages

Sales Ledger / **Purchase Ledger** / **Payroll** £29 each

Spread Sheets

Microchart plus 1 x manual £130

Microchart plus 3 x manuals £190

Microchart plus manuals £150

Sales Ledger and **Purchase Ledger** £7.25

Sales Ledger / **Purchase Ledger** and **Payroll** £175

On The Blink

Basic programmers take heart! This new software from Information Development Systems should make life a lot easier.

By Paul Evers

Calling all Basic programmers! Drop whatever you're doing and read on.

How many times have you been developing a large scale Basic program and wished that there was an easier way? Now there is because *Blink-44* from Information Development Systems has come to your rescue.

Just what is *Blink-44*? The answer is quite simple. *Blink-44* is a linkage editor for Basic programs. It enables programs to be constructed from a number of small modules stored as files on one or more disks.

The main advantages to this approach to programming are first, that small modules or subroutines are easier to handle, edit and debug. Secondly, programming in Basic is made more productive and reusable. Modules developed for one program can be stored as part of a library of modules and used as component parts of others as easily as standard Basic statements. As your library grows, so your ability to produce larger and more complex programs increases.

Broadly, *Blink-44* allows the programmer to make up a program of subroutines, then link them together to form a whole. The following example should show this clearly.

Normal Basic Program

```
10 POKE5120, 0:POKE5120,5
FOR16482
15 GOSUB560
20 PRINT"NOW IS THE TIME ETC
ETC"
30 GOSUB600
40 PRINT"PRESS ANY KEY TO
CONTINUE"
50 GOSUB 700
60 END
560 POKE5120, PEEK(5120) AND
219
510 RETURN
```

```
500 POKE5120,PEEK(5120)OR16
600 RETURN
700 WAIT100:POKE1660
720 RETURN
```

As you can see, this program is made up of a number of subroutines, some may be called repeatedly, others only once. Trying to keep track of all these subroutines in a large program can become tedious. Moreover the next time you write something else you have to re-do all the subroutines again which can become very monotonous.

With *Blink-44* the above program would look like this

```
Blink-44 Program
10 POKE5120,0:POKE5120,5
FOR16482
20 COSUB"SCREEN ON"
30 PRINT"NOW IS THE TIME ETC
ETC"
40 COSUB"SCREEN ON"
50 PRINT"PRESS ANY KEY TO
CONTINUE"
60 COSUB"GET KEY"
70 END
```

The subroutines 'screen on' 'screen on' and 'get key' would be individual files saved on your library disk.

When *Blink-44* is invoked with your link command it runs through your BASIC program (ie. the one in memory). Whenever it comes across a COSUB 'xxx' it looks for that subroutines from your disk and appends it at the end of your basic program. After all operations have been done it reassembles the entire program, substituting your named subroutines for numbered ones.

The above files are known as CODE files. One other use of *Blink-44* is the handling of DATA files.

The principle is the same, with a couple of exceptions. Data files can only contain R/M and DATA token words. Any other token word would

result in a fatal error.

There is a maximum of 155 distinct module references that can be appended in a single run. Line number values previously considered important when appending or merging basic programs, are now of little consequence. *Blink-44* always produces a correctly numbered program, regardless of line numbers in any source/destination modules.

Whenever *Blink-44* finishes a run, a summary screen is displayed giving some simple statistics about the linked program. The summary looks like this:

```
1 Start of BASIC - Lower limit of
BASIC memory area.
2 Start of VARIABLES - End address
of BASIC program.
3 Top of BASIC - Upper limit of
BASIC memory area.
4 CODE modules named - Number of
Code modules included, including
this mod.
5 CODE modules included - Number
of modules in linked program.
6 DATA modules named - Number
of DATA modules specified as
connected here.
7 DATA Modules included - Number
of DATA modules included in linked
program.
8 Bad Filenames - Number of illegal
module names, as encountered.
9 Bad line numbers - Number of
illegal line numbers encountered.
```

There is so much more I could say about the program, unfortunately space is running out. All I need say is that after trying this program out, I felt that no Basic programmer should be without it.

Footnote

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Disk Archive

A handy set of five programs to help you save your programs in tape as a convenient form.

Abstract

The purpose of these programs was to help ethnic children learn to become bilingual and bicultural. The

The backup on tape procedure is to access the standard CBT speed (even faster than standard tape format). This means that the 175K of a 184K disk drive are packed on only five minutes of tape.

That is what we have done: each of which serves approximately 50% of all data, in total consuming order 8.5 blocks on the read head, or one full revolution. This means that a disk copy will always fit. And length of tape, a useful feature if you want to prevent upstart data sets on already existing copy tapes (don't think of tape examples — if blocks do not read properly, there are mistakes in the data on the entire copy will be shorter. It also means that it is not really worthwhile to use the program to save much more data.

The program is made up of two complementary parts. MICOPTD and MICOPTH. MICOPTD saves drive contents and MICOPTH reads it back to disk. These programs can also be used with the 1977 disk drive or 1984 model. However only single-sided disks on the first side of a double sided can only be saved with this version of the program. To use MICOPTH just RUN the two BASIC programs before leaving drive don't forget the DATA 000000 from every diskette disk must not contain such command. Of course, lower files are created on disk, a formatted disk must be in the drive.

Getting Started

Load MCOFFSET disk to target
Make certain that you are going the
leader of the tape
Put the disk to be copied in the drive
Run MCOFFSET the introductory
message appears
Press record and play (the tape does
not make VHS)

From **RETURN** The programmer asks to read the disk, then instructs its contents not to tape as three steps. **DO NOT** stop the number between steps. When the process ends the message "END OF COPY" appears, along with error messages if needed. Now the tape cassette reader.

An error does not always mean that the whole copy is bad. However, when the tape is read the same error will be recreated on the new disk (i.e. the copy, so tape will be shorter). Therefore, it is up to the user to decide what to do when such an error is seen.

Reading Back

```
Load MLCOPY.D (Data to disk)
Put a new disk in the drive
Put a cassette into the datarack. Position
tape to read the first of the three
substations previously saved. Reading
over the end of other data does not
matter here. MLCOPY only starts
reading after having found a special
synchronizing header
Run MLCOPY.D
```

The road back proceeds in the same way as ABC-DEFGH, in three steps:

At the end of the process, the message "END OF COPY" appears. Remove the disk from drive (it doesn't matter if the red LED is still on, that's normal).

Two kinds of errors can arise during the metabolic process. Unfortunately, they are almost always fatal.

WRITE ERROR TRACK NN - means that the drive could not record the data it just wrote on that track. This is usually caused by a bad disk. Try again with another one (see also **TRACK LOADING ERRORS**).

TAPE LOADING ERROR The cassette could not be read back properly.

This is usually caused by use of the following:

Mail tape use only good quality, new service. Although the company said software used to write on tape is very reliable to use, mainly failures on the 60K75 means the most I previously wrote their programs using standard tape readers has an error record nearly every time in one of the three sequences of very slow transfer and the length of tape used was close dependent on task length to near their 177's. Try to use 6000 with standard tapes on the same tape type are very likely to see several errors, and use new

Received January 29, 1998; accepted April 2, 1998.

Hand band has gone out of alignment since the tape was written, because it

The spreader has been knocked on several times, and it is not clear whether the cause was speed changes that can lead to accidents.

The tape has been damaged, usually irreversibly.

Too much history equals anxiety.
 Forward it and copy.

You can speed it a recommended, leave blank space on tape between disks, so do that, just press the 1 key and the recorder starts. Sing by phone, one way or the other.

```

PROGRAM CSM21E
000  DD  DD
001  DD  DD  CSM21E  RECEIVED  ON  01
002  DD
003  DD  DD
004  DD  DD  PAST  2300  TO  TIME  0400
005  DD  DD  PAST  0400  TO  06  0400
006  DD  DD  0600  TO  0800
007  DD  DD
008  DD  DD
009  DD  DD  ON  A  24 HOUR  DAY  CSM21E
010  DD
011  DD  DD  WRITTEN  BY  J  LORAN
012  DD
013  DD  DD
014  DD  DD  CSM21E  TWO  REVISIONS  OF
015  DD
016  DD  DD  CSM21E  CSM21E  CSM21E

```

01	160	1978-1979	1978-1979	1978-1979
02	160	1979-1980	1979-1980	1979-1980
03	160	1980-1981	1980-1981	1980-1981
04	160	1981-1982	1981-1982	1981-1982
05	160	1982-1983	1982-1983	1982-1983
06	160	1983-1984	1983-1984	1983-1984
07	160	1984-1985	1984-1985	1984-1985
08	160	1985-1986	1985-1986	1985-1986
09	160	1986-1987	1986-1987	1986-1987
10	160	1987-1988	1987-1988	1987-1988
11	160	1988-1989	1988-1989	1988-1989
12	160	1989-1990	1989-1990	1989-1990
13	160	1990-1991	1990-1991	1990-1991
14	160	1991-1992	1991-1992	1991-1992
15	160	1992-1993	1992-1993	1992-1993
16	160	1993-1994	1993-1994	1993-1994
17	160	1994-1995	1994-1995	1994-1995
18	160	1995-1996	1995-1996	1995-1996
19	160	1996-1997	1996-1997	1996-1997
20	160	1997-1998	1997-1998	1997-1998
21	160	1998-1999	1998-1999	1998-1999
22	160	1999-2000	1999-2000	1999-2000
23	160	2000-2001	2000-2001	2000-2001
24	160	2001-2002	2001-2002	2001-2002
25	160	2002-2003	2002-2003	2002-2003
26	160	2003-2004	2003-2004	2003-2004
27	160	2004-2005	2004-2005	2004-2005
28	160	2005-2006	2005-2006	2005-2006
29	160	2006-2007	2006-2007	2006-2007
30	160	2007-2008	2007-2008	2007-2008
31	160	2008-2009	2008-2009	2008-2009
32	160	2009-2010	2009-2010	2009-2010
33	160	2010-2011	2010-2011	2010-2011
34	160	2011-2012	2011-2012	2011-2012
35	160	2012-2013	2012-2013	2012-2013
36	160	2013-2014	2013-2014	2013-2014
37	160	2014-2015	2014-2015	2014-2015
38	160	2015-2016	2015-2016	2015-2016
39	160	2016-2017	2016-2017	2016-2017
40	160	2017-2018	2017-2018	2017-2018
41	160	2018-2019	2018-2019	2018-2019
42	160	2019-2020	2019-2020	2019-2020
43	160	2020-2021	2020-2021	2020-2021
44	160	2021-2022	2021-2022	2021-2022
45	160	2022-2023	2022-2023	2022-2023
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Letters

The page in Your Commodore written by our readers for our readers.

Neglected CM

I am writing with reference to R. Jordan's letter in the November issue of *Your Commodore*.

R. Jordan wrote regarding the lack of magazines for the C16. I buy two Commodore magazines, one of which is *Your Commodore*. Both give the C16 a fair chance but if you buy any magazine you should expect it to be dominated with articles for the C64.

There is a magazine available which caters for just the C16 and Plus/4 but it is only obtainable by mail order subscription. The fee is £10/£15 overseas and it features reviews of both computer software. Club members are allowed free classified ads and it is mailed throughout the year. It's a monthly magazine so that's not bad for a paper is off Choppers, postal orders or international money orders should be sent to: Micro C16/Plus-4 User Club, (20 User) Micro-Media, 42 Mount Street St. Cuckles, Limerick, Ireland ML9 5TB.

Also if you C16 Plus/4 users are interested in user defined characters who they interest me so SAE and I will send a copy on tape.

At Jendres 17 College Glade, Carleton Place R9B 1T2.

Nationwide Club

Perhaps *Your Commodore* would be interested to know about the recent formation of The National Computer Club. As Mr Humphrey pointed out in November's mailing, other magazines have moved towards game playing and away from real computing. Unfortunately, localised computer clubs have, all too often, done the same thing. Consequently computer hobbyists have tended to drift away and their expertise has gone with them. This has left large numbers of enthusiasts without the personal contact and development of ideas which:

The National Computer Club

(NCC) is seeking to fill the gap by providing all the benefits of a local computing club but on a nationwide scale, giving members the benefit of personal contact with a large pool of knowledge, expertise and experience.

Our aim is to produce an environment within the club, where members can contact one another to find solutions to problems, answers to questions to form computing relationships with other, like-minded members.

The club caters for all levels of experience from beginners to experts and for all machines - from home built. This is important because we view computing as 'computing' and not 'supercomputing', 'Commodore thing' or even 'Bosung'. No disrespect intended since most of us first got computing to get one machine, but entering within the overall term 'computing' came from Bosung programming right through to machine building and a great deal of information and programming (with modifications) is applicable to all machines e.g. address decoding, machine code flow charts, etc.

The NCC is a 'computing' club and therefore caters for all computing interests. Of course a Commodore user, thinking of buying a particular program, might want to hear the views of others who already have the program. In the NCC he can ask them. I should add that the monthly hobby of games writing is a part of the NCC, but games playing, obviously, is not. However, players who wish to move into computing are very welcome.

The way that members make contact with others whether for help or for computing relationships is through our monthly bulletin which is for the free use of members. Included in it are sales, wanted, queries (listed by difficulties or general interest), personal projects, items of interest such as utility contacts, techniques, etc, and wherever else the members would like to say. For instance somebody might need the part-out of a particular logic chip. He could advertise it in the bulletin and other members who just happen to

have that information would send it directly to him. He might also have noted what he is doing, or read asked for others who are doing the same to get in touch for the sharing of information and mutual progression.

Finally for a more SAE, I would be pleased to send further details of the NCC to any of your readers.

Philip Cronin NCC 333 Buxley Hill Road, Bradford BD3 1JF

International Club

I am a reader of *Your Commodore* and I have founded, with two other people, a Commodore user club for C16 and C128 owners (link down only).

We have approximately 20 members in Switzerland, France, Belgium and now in Norway. We would like to get in touch with users in the UK and USA. If any *Your Commodore* readers are interested we would be very pleased to hear from them. We would also like to hear from other Commodore computer clubs. *P. Anglin, Bussard Gasse 13, Ave 16 St. Jean, 1201 Geneva, Switzerland*

Gateway Success

I very rarely write a letter to a computer magazine, but I think *Your Commodore* deserves one. Firstly because of the free tape you supplied with the November issue.

The game R1 D1 was brilliant, great graphics, good sound and very welcome gameplay. It was better than a lot of games I have bought from the shops. I thank the author of the game, Tony Crumley, very much for it.

Mr. I also thank you for making my introduction and software for the C128, as I have recently bought a Commodore 128. *Your Commodore* seems to be the only magazine with sufficient coverage of this computer.

Well done, thank you for a brilliant magazine. *Paul Aspinall, Bristol*

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TAPE TO DISK CONVERSION
42 PAGE MANUAL**

100

RTM commands: AUTO, ALIGN, COLOR, DIR, DRIFT,
SPKE, COMP, PWD, HANDCAT, HANDCOPY, HOOK, INFO, KEY,
PAUSE, PLOT, EPOCH, RINGDOWN, REPEAT, SAVE, TRACE,
UNDO, ZOOM, ZOOMIN, ZOOMOUT, ZOOMX, ZOOMY

PROBLEM 10. Also consider all the COPIES a customer can buy. Allow part of a program to be the replacement or "displacement" of a unit. How are we going to count?

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10. **What is the main purpose of the passage?**
 (A) To inform the reader about the history of the city.
 (B) To describe the current state of the city.
 (C) To analyze the economic impact of the city.
 (D) To evaluate the cultural significance of the city.

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The MATLAB Clust toolbox automatically generates the following figures: H1(1) and CPES. With 3D wire graphics, we present the dependence of μ on τ . The H1(1) function shows you in depth an angle (dotted line) and normal (solid)

Age Group	Percentage
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55-64	~15%
65-74	~10%
75-84	~5%
85+	~2%

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Making Light Work

C16 and Plus/4 owners should read on to find out just how good is the Trojan linkbox for the computer.

Dr. Frederick A. Moushinski

B-riding: Passes everything you see on the screen through a series of filters. The CAD-Master package (CAD = Computer Aided Design) for the CIB and Plus4 machines is a light pen-based system and comes complete with many drawing software and special adapter. Setting up the system is very straightforward. The adapter plugs into the joystick port and converts the nonstandard circle Commando port into the more common D-type socket. There are two versions of this program — one for each machine so it is necessary to make sure that you load one to connect one — especially as the Plus4 will load both and there is a considerable difference in the number of functions available. The newer will connect to the Plus4 version unless others are specified.

After loading, you are presented with a menu screen detailing the different shapes, pen widths and colors available to you. Selecting an option is simply a case of pointing the light pen to the appropriate area of the screen. You can draw an arc or a variety of styles. Thick and thin lines, solid or dashed and three different thicknesses of dots. Drawing a board is a horridly slow and painstaking task and takes considerable practice to master. Any generic or traditional system could beat the light pen hands down. Shape drawing is considerably easier. Select the shape or pattern from the menu - you can select from boxes, bending, oval, lines, triangles and circles. Position the light pen at the intersection



position on the screen where you want the shape and press the selected key. The screen flashes, and a dot appears where your light pen was. This can now be freely adjusted using the cursor keys and the pencon separator for, say, the other two corners of the rectangle.

Areas of your design can be copied elsewhere on the screen, doubling rather or both of height and width as required. Areas of the screen can be filled in with different colours, although care should be taken if the design does not "lock" - the area must be enclosed by solid lines. There is an inset function if you do make a mistake. Between one end of the screen

available pens and the wash function should be made in order to avoid colour claims in misdirection of lines and shapes. Text can also be included in your patterns should you wish to capture them.

Having considerably less memory to play with than the C16 version, a writer needs the MS-Mathistry three to save space for common functions and the one associated with the keyboard drawing and associated options work as an analogy. One feature not included in the Plus/4 version is the ability to draw either a circle or an ellipse. The manual, which is generally poor, is decidedly shoddy here. About five

mounting on getting all these designs? There is also the following piece of mail. Having pointed out the contradiction, I had the second points referred to the CIRCLE must be at 45 degrees to the first point on an EULIPSE (as well as be done). The problem is that both points can never be at an angle to each other - they are joined by a straight line on the circle as a measurement. What I think has meant is you saw that if you imagine a vertical line drawn through the first dot, then the second dot can be placed on angle of 45 degrees to that line. In other words, if north is at the top of the screen, then you get a circle of the second dot at N45, S45, SE, or SW. Anywhere else results in an allusion.

Using the light pen itself, as an eraser, is an unexpected art. You don't need to apply pressure but you do have to ensure that the pen is flush with the screen – and always stay with a curved stroke. My own personal experience is that they are stressful and cumbersome to use.



and offer no advantage whatsoever over traditional graphic packages. The advent of the minis or even the humble personal has all but killed them. For computer applications it is only on low-cost readers have they found any great commercial value. Poor documents are not the answer.

program attached on one half was through a person with army problems) means that the package cannot be

Company	Computer	Capital
Project	Language	DBMS
IBM		

C16 AND PLUS 4 OWNERS SOFTWARE AT BARGAIN PRICES

Abstract

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Checksum Program

The hexadecimal numbers appearing in a column to the left of the listing should not be typed in with the program. These are merely checksum values and are there to help you get each line right. Don't worry if you don't understand the hexadecimal system, as long as you can compare two characters on the screen with the corresponding two characters in the magazine you can use our line checking program.

Type in the Checksum Program, make sure that you've not made any mistakes and save it to tape or disk

immediately because it will be used with most of the programs and listings appearing in Your Commodore.

At the start of each programming session, load Checksum and run it. The screen will turn brownish yellow characters and each time you type in a line and press the RETURN key a number will appear on the screen to show. This should be the same as the corresponding value in the magazine.

If the two values don't match in one instance, you have not typed the line exactly as printed so go back and check each character carefully. When you find the error simply correct it and

















press RETURN again.

If you want to turn off the checker simply type STOP and the screen will return to the familiar blue colors. You can then do whatever it was you wanted to do and if you don't use the screen where Checksum lets you can go back to it with the same STOP command.

















No system is foolproof but the chances of two errors cancelling one another out are so remote that we believe our listings are more reliable than any other magazine in the world. So go typing!

77

Memorize Symbol Keypress

[RIGHT]		CURS left/right
[LEFT]		SHIFT & CURS left/right
[DOWN]		CURS up/down
[UP]		SHIFT & CURS up/down
[F1]		F1 key
[F2]		SHIFT & F1 key
[F3]		F3 key
[F4]		SHIFT & F3 key
[F5]		F5 key
[F6]		SHIFT & F5 key
[F7]		F7 key
[F8]		SHIFT & F7 key
[HOME]		CLR/HOME
[CLR]		SHIFT & CLR/HOME
[F9/SON]		CTRL & 9
[F10/ST]		CTRL & 0

Memorize Symbol Keypress

[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8
[POUND]		#
[BARROW]		_
[UPARROW]		↑
[F9]		SHIFT & ↑
[INST]		SHIFT & INST/DEL
[REV T]		REV T
[CHIME]		CHIME + bell
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C16 Software Offer

May it never be said that we don't listen to our readers' requests. Due to great demand we are pleased to announce the start of Your Commodore software for C16 and Plus/4 owners.

Due to the great length and complexity of the programs that are available in Your Commodore we provide a Software Service that makes all of the software from each month available on disk or cassette. Unfortunately until now we have not been able to provide C16 and Plus/4 owners with cassette, only disk. We are therefore extremely pleased to announce that we will now be making cassettes available to readers of the magazine who own C16s or Plus/4s together with a disk option for their machines.

Versions of the disk or tape will be made available approximately every three months or when we think that we have collected enough material to make them useful to you. Unfortunately this does mean that you may have to wait a few months for some of the software, but this is one that you will think is worth the wait.

The cost of this service is the same as the tapes and disks for the C64 and C128, that is just £4.00 for cassettes or £5.00 for disk.

What Do You Get?

The first of these C16 Specials contains what we think is the best and most useful material that we have published over the last few months. We don't

supply instructions with the cassette since you should have these in the relevant magazines and this helps to keep the cost down. Should you not have any of the back numbers then these are available from the following address:

INFONET LTD, Tower House 179
The Marlowes, Hatfield, Herts. AL9 1BB
Tel: 08425 45435

please contact this address for prices and availability.

A set of photocopied instructions will also be made available for £1.50 should you want purchase the magazine. These photocopies are available from:

C16 SPECIAL A PHOTOCOPIES
Your Commodore
1 Golden Square
London W1R 1AB

Full Speed Ahead

As you are all no doubt aware the current loading and unloading on the C16 and Plus/4 is extremely slow. In the February 1985 issue of the magazine we published a routine that will allow you to run your own programs at 16 times the normal speed! This program

has proved to be one of our most popular programs for these machines.

Character Generator

The C16 and Plus/4 computers allow you to re-define the character set. This extremely useful program allows you to do this with ease and store your results for use at a later date. From April 1986.

C16 Speech

This program was published as part of our Programming the Commodore. It has proved extremely popular and has been used to great effect by a number of people. Recently the program allows you to generate music on your C16 that is run independently of any programs allowing to add music to your own programming masterpiece. From May 1986.

C16 Assembler

No doubt many of you will have played around with a little machine code. The C16 and Plus/4 have built in memory that makes this extremely easy. By adding this program to your collection you will be able to write your own assembler programs with greater ease. From June 1985.

The Monster Returns

All work and no play is bad for you so we've included this adventure game our July 1988 issue for your enjoyment.

Sound Sampler

Make your computer sound like any instrument you like. With this program you can record any sound and then store it while other computers you can even play it back onto the C88 so it may not be up to studio quality but it is great fun. From November 1988.

Plus/4 Assembly

This program not only gives your Plus/4 a great upgrade but it also adds some extremely powerful commands to the Basic including a debug routine. From December 1988.

This Issue

As well as all of the above we will of course be including our Plus/4 and C88 programs that appear in this issue of the magazine on the disk and tape.

Please Note

The Commodore Plus/4 computer is compatible with the C16 ROM so some people have been informed the C88 Plus/4 programs will not work on the C16 but C16 programs will work on a Plus/4.

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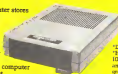
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Carte Blanche

The cartridge revolution has saturated the market with many variations around a theme. Your Commodore blows the lid off these mysterious little packages

By Eric Doyle

Once upon a time the most company producing cartridges for the Commodore itself, clearly followed by Supersoft. Again from Simon & Schuster, many of CIBM's output was games. Supersoft specialized in the excellent manner, wrote but no-one else really cared.

Suddenly there's a glut of these boxes on the market. Let's consider what limited cartridge should contain and see how a few of the most popular ones measure up.

For many people it seems that a turbo turbo-backup device is what that most serious users would also want upon a nice monitor. Being extremely should be limited to booter software (number, merge, delete, etc.) so that any programs developed will be transportable from machine to machine, regardless of the cartridge's presence.

Technically, the cartridge should be "transparent" to the standard CIB as that it will merely have to be removed. For the same reason the addition of a reset and cartridge on/off switch is highly desirable.

The cartridges we will be looking at are *Power Frame*, *QuickDisk*, the *Expert Power Cartridge*, *Ultimate Memory 50*, *Answer Key*, and the *Final Cartridge*. There is also a very special utility which doesn't fall into the cartridge category but make of that later.

Power Frame

Electronic Memory produces *Power Frame* and *QuickDisk*, an separate unit. *Power Frame* is purely a disk or tape backup utility and, as the current use leader points out, restricts for personal use only. The use of cartridge usage means, unless the software is distributed for some reason or other. Personally, I feel that QuickDisk must be considered as responsible for the majority of back-up users that goes on. What is disturbing is the fact that European prices are rising

that kind of this entry to pay games on to modern-based networks. Surely it would be possible to produce cartridges with individual identifier numbers (like the system which Commodore's *Compendium* handles) so that the cartridge must be present when the program is run.

Power Frame is a very simple product to use. When the computer is powered up you are faced with the Basic instruction screen. Simply by pressing the cursor key, the machine resets into normal power-up mode. The program to be backing-up is then loaded and then it is convenient (just the most buttons on the cartridge is pressed) and you then choose one of the three options for a memory save. This can be in turbo-disk, turbo-tape or normal disk format.

The days of the back-up cartridge are numbered in most and more alternative software checks for tape cartridges in a similar way as they look for a disk drive's presence.

QuickDisk

The cartridge does what it claims and very little more. It provides a fast load and save facility as well as making standard disk commands more easily accessible. This avoids the usual rigmarole of opening and closing files. Disk directories can be displayed directly to the screen without affecting any programs which is currently in memory.

Compared to most of the packages it is pretty far what it does and a combination of *Power Frame* and *QuickDisk* would probably make a more reasonable package.

The Expert

One way to try to define the cartridge better is to have a "real" cartridge. The *Expert* is one such device. It contains RAM memory which must be loaded up from disk before use. This means

that the cartridge can be modified easily and cheaply by loading the latest update disk on and where necessary.

The *Expert* contains the expected turbo-disk backup facility but there is also a very useful monitor which allows you to examine any part of the computer's memory wherever made the computer is in. This means that the cartridge will still operate even if the RAMs are switched out.

Modern cartridges only use a "lookahead" of a few bytes of memory so that they can interrupt the machine's normal operation on request. Sometimes a program requires the same memory bytes for programming space. This is why some chips cannot be saved by some "load" cartridges. With the *Expert* the lookahead can be interrupted with a simple command to avoid any clashes with software.

The main disadvantage of the *Expert* stems from its RAM based nature. Occasionally I've found that the memory can be corrupted so that the monitor fails to operate correctly. The only way out of such a problem is to power down, re-load the cartridge and try again. All very time consuming.

Power Cartridge

This is certainly one of my favorite devices for the use of fast and simple facilities. My only vague criticism is the bright red plasma display which makes it look a little ugly.

With this unit connected you have a three screen monitor, back-up and flexible screen dump facility at your fingertips.

The high resolution screen dump can be selected in one of two sizes. As format or portrait size. The dump can, depending to represent different colors and the preview can be inverted to give a "negative" image if preferred.

The machine code monitor and Basic token commands add the missing elements to the *Expert*'s RAM

systems and the various menu screens to understand and use.

Lithman

This is a good version of a utility, for the Atari and it really uses a program stored on cartridge. When you switch the computer on the memory is filled from the cartridge and the program is started by a SYS command.

The program is a disk assembler which, although sophisticated, is still beginner. Although most of the normal cartridge routines don't reach the standard of this machine, they do have the advantage of taking up very little space in the computer's memory.

I found the instruction manual with the Lithman cartridge to be difficult to follow and gave up when I found that I couldn't get some of the commands to work. There are a lot better assembler cartridges than this and I suggest you look at *Assembleit* or *Z80* as preference.

Rohcom 50

Although the Rohcom cartridge is stored into the C64's memory in the same way as *Lithman*, it does take advantage of the autoboot facility. This brings in a substantial Basic routine and the monitor can be placed almost anywhere in free RAM by a single command.

The cartridge offers a useful range of turbo-disk and turbo-tape commands. These are backed up by a very useful tape alignment facility and an alignment tape is provided with the package. This is an area all the other turbo-tape programs ignore and is a valuable provision. Knowing how accurate the automatic alignment must be for the successful load.

The disadvantage of both *Lithman* and *Assemble* is that any program running the same area will overwrite the cartridge and a serious crash results.

Action Replay

This is a turbo backup cartridge which also backs normal disk program files at high speed.

What makes this unique is the ability to backup unformatted games and to save high resolution screens for use with graphics programs. In addition there is a rudimentary disk assembler.

The supplier lacks a disclaimer or any method of modifying memory contents, restricting its usefulness considerably.

The Final Cartridge

This is a very useful cartridge with plenty of facilities. Apart from a range of very useful backup commands there are turbo-tape disk commands, high resolution screen dumps and a monitor. Back-ups can be made and the cartridge also has a sprite killer which will help you to walk through a few commercial games without being stopped by any monster which appears.

Beyond Cartridges

Of the range I have sampled my personal favourites were the *Final Cartridge* and the *Power Cartridge* but a decision on what you need. When buying a cartridge I would insist on a disclaimer first because they all represent a substantial financial investment and are better to be safe than sorry.

My attention has recently been drawn to a new European Memory product, *Deplon* 6005. This is not a cartridge but a replacement chip for the Kernal ROM inside the computer and a circuit board for the 1541 disk drive.

This goes to the heart of concerning the 1541 into a pseudo parallel drive. This means that the normal method of loading from disk by loading the byte contents into the computer is a long one (serial load) is replaced by allowing eight bits to enter simultaneously via the user port. The new ROM also converts the 64 into a disk only machine, so getting SHIFT and RUN/STOP results in disk loading rather than tape load. If you want to load a tape this can be done by switching out the new ROM and it then emulates the standard chip that it replaces.

The benefits of this chip have to be seen to be believed. A fast load cartridge gives a load speed which is 100% faster than the normal *Deplon* 6005 increases this to 20 times normal!

Taking an example of a 144 block program, normal loading will take about 80 seconds and fast load will reduce this to a mere 16 seconds. With *Deplon* the time is four seconds and you get a good quality monitor too!

Unlike many of the cartridges, the *Deplon* system will load a wide range of protected commercial disks with no problem. It is not suitable for the unformatted disks you simply back a month and use the machine as a standard 64.

Another advantage over cartridge

loaders is that the speed also applies to sequential and relative files. The speed increase is lower but still reaches a staggering 14 times the normal rate. For example loading something like SuperSoft with a cartridge won't make a vast amount of difference but with *Deplon* you're up and running in seconds rather than minutes.

You never get something for nothing and the first catch with *Deplon* is the price tag of around £75 (month even price, I may add). The second problem is substituting the ROM. If you're lucky your 64 may have a ROM in a DIL socket but the majority of 64s I have used and I've seen a 64 have the ROM soldered on to the circuit board. For many people, even if they are technically skilled enough, it will be difficult to remove the ROM without causing damage. I am so impressed with the performance of the system that I'd tend to advise removing the old ROM giving more attention to leaving the circuit board undamaged than worrying about damaging the ROM. You won't need it again so why worry?

The DIL socket is then soldered in place and the chip inserted. If ever you decide to go back to the old ROM a will cost about £20 for a new one but I guarantee that this is worth the risk.

I am not too sure and have about hardware but this is an exceptional product and I wonder how I need to manage better.

Although cartridge fast loaders will not enhance the loading speed further I've found that they all operate quite happily with the extended *Deplon* chip installed and will surely still continue to work well if switched on.

Cartridges make great Christmas presents and I can think of nothing better except perhaps a *Deplon* 6005.

Toshiba

Power Frame, QuickDisk, Deplon 6005, *Executive Memory Reader* 64, *Executive Writer* 6001, *DEF* Tel 0414 41869

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Interfacing with the RS232

Many people switch off when they hear the mention of the RS232 interface and related subjects. This article is aimed at clearing up some confusion and doubts.

By Steve Cattle

Some (if not most) of you will have heard by now of the existence of all computer industry subjects, the RS232 communications standard. People have been known to go weak at the knees and bide when it is mentioned. Every day it causes problems for computer engineers connecting up equipment such as printers and modems. It has even given rise to a lexicon because of building the so-called "breakout boxes" for monitoring and "daisy" RS232 lines.

If it is supposed to be an industry standard, why does it cause so much hassle? If every computer manufacturer has different ideas on how to build a computer which devices to use, how big the screen should be, etc. It would seem that this line of thought also includes the RS232 standard.

Now before I go on let me state that the idea behind RS232 is great. A standard interface for connecting different types of hardware (including computers) together. RS232 is really useful in the field of telecommunications. Modems are usually connected to a computer via an RS232 link. You can connect two computers together and transfer programs between them in a technique often called "posting".

Unfortunately things are not that simple. With different manufacturers having different ideas on how to implement the standard (Commodore is no exception) a great deal of confusion will arise when two pieces of hardware are to be connected together. Most of the confusion surrounds the way in

which the control lines of an RS232 should be used. Thankfully, this does not interfere us in this article since we will be using only a basic RS232 interface.

Basic RS232

As you may know, RS232 uses the serial method of data transmission. Information is sent bit by bit along a single wire to a receiving machine. Since data may flow in both directions two wires plus a common return are required to make a basic RS232 communications line. The lines are usually connected to equipment, by a 25-way D-type connector. (This means a computer needs two pins two and incoming data enters via pin three. The line return is connected to pin seven. This gives the "3-line" RS232 interface. There is no control over the flow of the data in either direction unless handled by the software (more on this later). An RS232 interface using more than three data lines is known as an "N-line" interface.

It is best to use a three or four wire cable with a shield (as well as why as a computer) rather than separate wires.

For the purposes of this article, this is all we require. "Ah yes" you say,

"That's all very well but my Commodore doesn't have a 25-way D-type connector let alone any RS232 interface". True it doesn't have a 25 way connector but it does have an RS232 interface. You mean you didn't know?

Commodore RS232

Since the time of the Vic 20 Commodore has "programmed" in a limited form of RS232 port. Any programmer because the hardware driver normally associated with RS232 communications, the Universal Asynchronous Receiver/Transmitter (UART), is contained in the circuitry of the Vic 20 C64, 486, C128 and C128+. The circuitry of the C16 and Plus/4 is extended. The C16 cannot handle RS232 communication (as shall we refer to a moment). The Plus/4 on the other hand is limited for a different reason. This machine (2048 have a UART.

RS232 again appears at the end point. This is exactly the reason why the C16 cannot handle RS232, it does not have a user port (a strange omission by Commodore. Anyone knows why?). All the conversion is handled by the Operating System (Kernal). This

3-LINE RS232 INTERFACE	CONNECTIONS (25-way D connector)
pin	Initialize
2	Transmitted data
3	Received data
7	Common (GND)

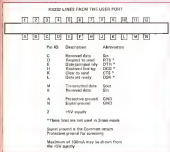


Fig 1

except in the case of the Plus/4) the user port employed with the Komrad format almost the equivalent of the RS232C/RT (the RS232C is the format that the software is supposed to emulate).

In the Vic the user port is controlled by a Versatile Interface Adapter (VIA). In the other machines it's simpler, basically Adapter (CIA) is used (not a lot of difference as far as this article is concerned). Now before some of you run and hide at the mention of VIAs and CIAs, let me say that (essentially) we do not have to program these devices directly. The board handles all of the RS232C associated programming.

Figure 1 shows the RS232C standard connections to the user port looking from the rear of the machine. Note that the user port uses a 25-pin edge connector (available from Melpac, order number 88768). The top row of terminals are identified with numbers, while the bottom row terminals are identified with letters. This means that it is very easy to connect the socket to the wiring, say up which could have disastrous consequences for your computer. The correct way is with the letters to the bottom as shown.

Connecting Up

The terminals labelled RxD (received data) and TrxD (transmitted data) and GND (the common) are the three lines we need. Note however that there is a 19VDC terminal labelled Sx. The reason for this lies with the way in which the RS232C on these machines works. One of the Sx lines is for data, the other is a flag or trigger input. Because the Commodore RS232C relies on Non-Maskable Interrupts (NMI) or interrupt requests (IRQ) in the case of the Plus/4, there must be some form of connection to let the system know when data is being received.

When data is being received over the Sx line, the voltage level on this pin changes rapidly, causing an interrupt to occur. The system software collects the data on the Sx line, placing it in a series of memory called the Receive Buffer. There is also a Transmit Buffer for outgoing data. Thus the reception and transmission of data is basically transparent to the user. However, this method has its problems as well as its. The practical aspect of all this is that RS232C Sx terminals must be connected to the Sx line. Since they are not (as you may find), this is a great problem.

Also near the connections called **PROTECTIVE GROUND**. This terminal should be connected to the shield of your cable if you suspect any external electrical interference of causing data errors.

While on the subject of making connections, you will have to use a soldering iron. Now don't run and hide (again) if you are not too sure about handling one, get an electronics hobbyist friend to do it for you.

It should go without saying that **YOU SHOULD NEVER MAKE CONNECTIONS TO THE SOCKET WHILE IT IS CONNECTED TO THE COMPUTER**. Always disconnect the socket **BEFORE** making or changing any connections and **NEVER** connect the socket to a live machine **ALWAYS** switch off the power **BEFORE** plugging or unplugging!

OK, so you've connected your socket up and plugged it in the correct way. What now? If you only want to communicate with another Commodore (Vic, C64, Plus/4 or C128) then there is no great problem. The only thing to watch is that you must connect the line of one machine to the Sx of the other as in Figure 2 in order for them to exchange data (a bit obvious really).

Commodore connections

If you don't intend connecting your machine to anything other than another Commodore, you can stop the next lot all together and get on with the programming. If you have a friend with one of the machines mentioned you will be able to type messages to one another, hardly if you live next door and you have a long piece of 4-core cable - your own mini network! (Not recommended if you live across the street or several houses away!) Now for you will be able to keep the machines apart, depends very much on the operating conditions. Electrical interference may cause errors and there will come a point where the line is just too long. It is best to experiment with what you have.

Non-Commodore Connections

This is where things get tricky. Connecting up anything other than a similarly equipped Commodore has its

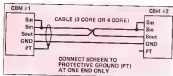


Fig 3

problems. This is because minimal RS232C requires logic levels -12v (logic 0) and +12v (logic 1) as opposed to the Commodore RS422 logic levels of 0v (logic 0) and +5v (logic 1). (Note that not a minimum RS232C logic is opposite voltage level-wise to your Commodore.) However, this problem can be overcome quite easily. There are various logic devices available specifically for this purpose. Among these are the RS422 line driver 644 and RS422 line receiver RS181204. These devices convert between TTL logic levels and RS422 logic levels. RS422 is another (positive) standard which is compatible with RS232 (as long as a certain point). The benefit of using these devices is that they will operate from a +5v/+5v supply. This means that the user port's +5v output (see Figure 1) may be used for the +5v supply and -5 that is required is a -5v supply. These are the devices used in the 644C macro for the RS422 port. Figure 1 shows the results required.

I can hear the groans of discontent: "I can't do that! I've never built an electronic circuit before!" If you do have an electronics background (even) try building something into building it for you.

I will not go into detail over the construction of the interface. I will ensure that if you are building this, you know what you are doing. The 74LS480 device is used here as a logic receiver. It suggests that you use it to convert so as not to subject the devices to heat which could damage them.

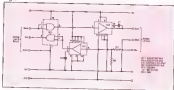
Power Supplies

If you plan to use the same (parallel) power supply circuit shown in Figure 4, I suggest that you use both the +5v and -5v supply outputs to do so to rely

too much on the already overworked computer power supply. I put without saying that no-one should use the means unless they do know EXACTLY what they are doing.

The alternative battery supply circuit in Figure 3 assumes that you are using the +5v supply from the computer. This circuit may also be used with one of those pocket calculator mini-adapters (like the Spectrum power supply) where the current regulates the voltage to -5v. The disadvantage is that the circuit is incorrectly connected. Remember to disconnect the battery when you are not using the interface. This has the advantage of not requiring you to build a main-power supply.

Remember that you cannot connect an ordinary Commodore (without this interface) to one using this circuit. Both machines must be similarly equipped. Using this interface, you will be able to connect your Commodore to other computers such as the BBC, and also suitable equipped IBM compatible. I have connected my C128 to my Tandy 18100 (IBM compatible running MS-DOS) and Fig 3.



transferred files between them without any problems. This should also work with the Commodore PC16 and PC20 IBM compatibles. The only thing to watch for here is that most IBM compatibles need to have particular and line (RTS) and CTS) connected together as shown in Figure 4. The BBC will also require a similar connection. Because of RS232C differences between systems, I cannot say that this will work with every machine, but it will work with most. I have also connected my C128 up to a mainframe EXECUTESTM 3000 running at 1280 baud with absolute success.

Programming Commodore RS232C

OK, so you've got the hardware linked, now Commodore to another machine. What now?

Using the RS232C interface on a Commodore is much the same as using a printer or a disk drive. You need OPEN a logical file and use PRINT# and GET# to read and receive data. Note that you should NOT use INPUT# since there is a possibility that the system might hang by attempting to get input when it isn't there. Also be aware that as the Vte 38 and C16 the RS422 receiver and transmit buffers are created at the top of zero memory when the OPEN command is executed. (The buffers are pre-allocated defined on the C128 and I think the Plus/4). This has the effect of wiping out any variables previously defined. It performs a CLEAR. Therefore you should make the OPEN RS232 statement the first in any program. Another more serious problem occurs if you have a program in your laser. Then there is a chance that OPENing an RS422 channel may destroy the end

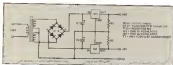


Fig 4

```

50 RS=INKEY$
60 IF RS="" THEN PRINT
80 PRINT RS,
90 GOTO 50

```

Both programs check first for a character from the RS232 port. If one is found, it is output to the screen. It isn't the program checks for a key-board input. If found, the character is sent to the screen and also to the RS232.

Another interesting experiment when using an IBM compatible machine is to make the following change to the main terminal program on the Commodore:

```

60 IF RS="" THEN PRINT$ RS,

```



Fig 5

Obviously not many of you have access to an IBM, but this experiment does show up one very important problem with the Commodore's fake RS232 solution. If you take control of the IBM using the CTTY COM4 (command open and type DRR is back is the MSX05 command to display the directory status line) low lines are ground normally and then suddenly, there is a whole lot of garbage. If you drive down the line hard once to try RS, the problem

and run it. Now type the following on the IBM which is DRR:

```

MODE COM1 1200N,1
CTTY COM1

```

(MODE is entered in hex, containing the command must be in the device drive)

This causes the IBM to think that its input/output device is the RS232 port instead of the console. They lose the very odd effect of making the Commodore control the IBM (although the character sets are different and some odd graphics characters may be present). To return control to the IBM console you must type CTTY COM on the Commodore.

may disappear. Why does this happen? Remember what I said about the Receive buffer? Well what happens is that data is received in excess of the RS232 baud and placed in the buffer. The buffer fills up quicker than (any) one byte is with the result that the buffer overflows and data is lost. Buffer overflow can be avoided by examining the RX status variable but this is just too slow and you may still loose data.

Fig 6



Solutions

There are a few ways of solving this problem.

1. Use a slower baud rate to let Basic loop up
2. Devise some form of software data flow control
3. Connect control lines up and use an ASCII interface
4. Use machine code to process RS232 data

Option 1 is not a good idea. Anyone who has used an RS 232 link at 500 baud will know why (yawn)

Option 2 is better but requires programming which we will touch on later when we discuss file transfer.

Option 3 is not really practical here.

Option 4 is probably the best solution at this time. Data can be received from the buffer much faster using machine code and that will be fine for the speeds at which we will be working (up to 1200 baud).

A very short machine code program can be written to handle the RS232 interface. The routine that follows is given in the form of a Basic loader. Change the variable AD (again this one is your computer's memory) to the right buffer (a good place). This program is for a C128 but it should work on any of the Commodore machines discussed.

```

30 OPEN 2:RCHR$(4)+CHR$(0)
40 IF RY = 1 THEN FORK
AD BY AD= AD+1:GOTO 30
50
60 PRINT CHR$(14);REM SWITCH
TO LOWPRIORITY
70 SYS CA
80
90
100 DATA 302,13,198,255,12,255,
101
110 DATA 32,254,215,152,260,132,216,
111 255
120 DATA 32,228,255,240,233,72,
121 2,0
130 DATA 281,255,194,12,233,255,
131 0,204
140 DATA 255,56,176,217,1

```

The only way out of this program is a RUN/STOP/STORE. Table 1 is the disassembled code with comments. Addresses may differ from your version.

0000 LDA #0002	Make channel 2 the output device
0003 JSR STPC0	
0005 JBR SPFC4	Scan the RS232 buffer for 1 character
0008 TAY	Save data
0009 JSR SPFC0	Clear the channel
000C TYA	Remove the delay
000D BQO SOB01	If data in a shift (a zero byte) then skip
000F JSR SPFC2	Output valid character
0012 JBR SPFC4	Check for keyboard input
0015 BQO SOB00	If none then check RS232
0017 PHA, Jump data	
0018 LDA #0002	Make channel 2 the current output device
001A JSR SPFC3	
001D PLA	Remove data
001E JSR SPFC2	Send byte to RS232
0020 JSR SPFC0	Clear channel
0024 SEC	Reset loop to check RS232 input
0025 BCS SOB00	

Table 3

The program uses the internal jumpable with user should be used for all of the machines.

After the machine code has been placed in memory, the RS232 channel is opened with a file number of 2 (the channel number). If you change that

you must change the two LDA instructions in the code and the machine code lines are called. Now the RS232 receive buffer does not get a chance to fill up so data is lost. The OPEN statement could be replaced by the code in Table 4.

LDA #0002	Channel 2
LDA #0002	Device 2
LDA #0002	Secondary Address 0
JBR SPFC4	Set logical file
LDA #0002	3 chars in filename
LDA # NAME	Pointer to filename
LDA # NAME	Pointer to filename
JBR SPFC4	Set filename
JBR SPFC0	Open RS232
End of code	
NAME #0000	Control and command register address (PL115 1-)
NAME #0005000	In the base address of reg. 004 and 005
address	

Table 4

Character set translation

All this should be fairly straightforward to Commodore users because it will also work with Commodore to IBM-PC or PC users but may yield strange results, the reason being that the Commodore does not use standard ASCII codes. They use what is sometimes called PETSCII, the Commodore PET being the first to use it. The most noticeable effect of this is that certain characters will appear on the Commodore's screen as graphics characters. The solution to this is to insert some form of translation table or routine into the code. Some data

flows two ways a routine or table would be required for each of input and output.

Two translation tables, each of 256 bytes, are required to handle outgoing and incoming data translation. The following program builds the translation tables, and the machine code into memory starting at address AD. It needs at least 400 bytes to operate so you need only change AD to the address you require. The version is for the C128 (Program Translated).

Program: Translate

Line 5 AD=start address, BR=Control reg, CB=command reg

Lines 10-300 Prepare tables
Lines 111-113 Setup name of channel (register number)
Lines 130-160 POKE routine table
Lines 170-200 POKE routine table
Lines 210-250 POKE routine to memory
Lines 260-270 Adjust table references to code
Lines 280-290 Adjust register name references to code
Lines 300-310 Select lowercase and cell counts
Lines 320-330 Code data

Table 5 shows the disassembled machine code (addresses are offsets from the start address).

Basically, the operation is the same as before except:

1. The channel is opened from machine code.
2. Characters sent and received are translated.

Note that the brackets () characters received will be displayed as a pound sign. The CEM Channel does not have a bracketed.

Transferring files via RS232

This is probably the most useful application of RS232, transferring data between various machines. It is possible to transfer programs between two entirely different machines.

When using a 3-line interface, it is necessary to understand some form of protocol with the software at both ends. This means that each machine understands exactly what the other needs to do.

A typical protocol exchange would look like a conversation between the two machines:

machine 1: Are you there?
machine 2: Yes
machine 1: Beginning data transfer
machine 2: OK
machine 1: Transferring data (block of data sent)
machine 2: Received data

and so on. The "are you there", "yes" via messages are usually 1 byte control codes. Normal ASCII has 128 control codes (codes 0-31). The actual range varies from system to system and there are only two protocol standards. For your own use, you don't have to follow any set protocol AS LONG AS BOTH MACHINES ARE USING

THE SAME ONE Figure 9 summarizes of ASCII code 0-31 and their meanings.

Note the two modified XON and XOFF. These you may recognize XON/XOFF protocol is useful where large amounts of continuous data are being transferred. The receiving machine can send an XOFF code when it wants the transmitting machine to hold off sending data, and send an XON when it wants to resume. This type of control is often used with dumb terminals to manufacture.

Another method of transferring data is to send it in blocks of 32-255 characters (usually 128 char). This means the need for XON/XOFF control because in each block is sent, the two machines exchange control codes. This method of transfer also allows error checking to be carried out on the data. One of the most popular error check methods is the Cyclic Redundancy Check (CRC). We won't go into this here as there is no real need for such a complex check with hardware RS232. CRC is really useful for Teletype transmissions via modems. These lines are noisy, and data errors may easily result in high level errors. The CRC error check allows the two machines to either send or check the data for errors, if an error is found, the receiving machine requests that the data is transmitted again.

When sending data using the block method, the software collects data bytes into 'packets' of 128 bytes. Assuming the link is open, the transmitting machine (TM) sends a start-of-transmission code. The receiving machine (RM) replies with an acknowledge code. The TM transmits a start-of-block code followed by a data packet followed by an end-of-block code. The RM replies with an acknowledge code (assuming the data was received correctly) and the TM sends the next block. This continues until all data has been exchanged, whereupon the TM sends an end-of-transmission code and the link enters a wait state.

The above description does not conform to link standard but will work. If error checks are included the RM could send a data-error code if the data had been corrupted whereupon the TM would retransmit the same data packet.

0000 LDA #000	: logical channel 2
0000 LDA #000	: channel 2
0004 LDY #000	
0004 JMR BPP RA	: Set RA
0009 LISA LMR	: Name length (2 char)
000A LISA P-NAME	: NAME is address of char string
000B LDA #NAME	
000F JSR STP00	: Set RA
0011 JSR STP00	: Open
0013 LDA #000	: Make RS232 the input device
0017 JSR STP00	
001A JSR STP00	: Get a character
001D TAY Save it	
001E JMR STP00	: Restore default device
0021 TEA	
0023 BQZ 002A	: If char =0 then no char rec
0024 LDA RXTABLEY	: Get REXTABLE char from RXTABLE
0027 JSR STP00	: Send no screen
002A JMR STP00	: Check keyboard
002D BQZ 001D	: No char - loop to check RS232
002F TAY	: Index
0030 LDA TXTABLEY	: Get ASCII equivalent
0033 STAA	: Save
0034 LDA #000	: Make RS232 the default output
0038 JSR STP00	
003B PL 4	
003A JSR STP00	: Output character
003D JSR STP00	: Restore normal output
0040 SEC	: Period loop
0044 BQZ 0015	

Table 5

The program given in Figure 14 should run on any of the CRM machines discussed and is written in Basic. Since the controls are being controlled by the software, the receive buffer will not overflow. It allows a user to transfer a data file from one machine to another. The link is 1280 baud, eight data bits and no parity. It should be run on both machines. The control codes are shown in Table 6.

Note that I'm not using some of these as they should be used but as I did earlier, as long as you stick to the same protocol on both machines, you'll be OK.

Possible Developments

The example programs I've given here do not show all of what may be achieved using the RS232 interface. It is possible (using a special version of the nearest described earlier) to have more than two machines running on a single RS232 connection. This would allow a group of users (with special software written at machine code for maximum speed) to set up a local network. The possibilities are endless. I hope this article has helped to feed your imagination. If you have any comments or ideas, please write to me via Your Commodore or leave a COMMENT on CompuServe ID SC12.

Table 6

Code	ASCII	Meaning in this program
5	ENQ	Access/Assign
6	ACK	Acknowledge
1	SOH	Start transfer transfer character
4	STX	End transfer
2	STX	Start block
3	ETX	End block
26	HAZ	Enter manual mode (special seq.)
18	DEL	Exit manual mode (data link escape)

79	1000 RETURN	NOT BACK TO A	41	1000 RETURN		66	1000 :	
80	1000 RETURN		42	1000 RETURN		67	1000 :	
81	1000 RETURN		43	1000 RETURN		68	1000 RETURN	
82	1000 RETURN		44	1000 RETURN		69	1000 RETURN	
83	1000 RETURN		45	1000 RETURN		70	1000 RETURN	
84	1000 RETURN		46	1000 RETURN		71	1000 RETURN	
85	1000 RETURN		47	1000 RETURN		72	1000 RETURN	
86	1000 RETURN		48	1000 RETURN		73	1000 RETURN	
87	1000 RETURN		49	1000 RETURN		74	1000 RETURN	
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C16/Plus 4 Reference Book

A new book from ANCO may be just the thing that all C16 and Plus/4 owners have been waiting for.

By Stuart Cooke

Despite the fact that Commodore does not seem to be supporting the C16 and Plus/4 computers at all, the machine seems to be doing surprisingly well. The fact that it was possible to buy a Plus/4 for around £60 can have something to do with this.

Many software buyers have now started producing good quality software for these machines and are doing very well for themselves. However, the problem occurs when a C16 or Plus/4 owner wants to start writing their own programs. Here, there are no problems, all the information that one requires can be found in the manuals accompanying the computer.

Should you want to enter the world of machine code and the world of professional computing then I'm afraid that it is a different story, there isn't much information about.

Now, if you're looking to change all of this with a new book, C16/Plus 4 Reference Book. To quote the manual: "The book contains all the manual information that you need to know when using your Plus/4 and C16. All the important topics are explained in detail, the same already covered in the manual teamed with the computer have been omitted. The graphics and machine language are specially treated and demonstrated with example programs."

So does the book live up to its introduction?

The book comprises of five chapters each dealing with a specific

subject. The first of these is graphics. The manual deals with the basics of graphics so with this little more it's enough to get you to POKE graphics characters on to the screen, complete with a new memory map of course, a sample of how to POKE characters on and the whole section is easily understood by anyone who has a rudimentary knowledge of the computer. Following this the chapter goes on to discuss the possibilities of using the 256 character set, again with a detailed example program that redoes a character - it changes the sign to a degree symbol.

This chapter though clear shows that the book was probably made to run on the Atari as there are quite a number of mistakes that should have been caught. For example, if you can make sense of the following sentence, which is, by the way, the first sentence in the section dealing with individual characters, you're a better person than I am. As you have already learnt in chapter 31 the correct and true memory space conventions for graphics characters in the C16 is the most of the existing characters.

But never mind the rest of the section makes things clear and it is well worth reading.

One last machine graphics section of the way (I'll leave the world of high-res graphics, multi-colour graphics and extended-colour graphics. Again the explanations are clear and concise and illustrated well



with a program. A machine code program to allow you to draw on the

screen with a joystick is given and then is used to illustrate some of the points.

Soft-encoding of the screen (moving it up one pixel at a time) is dealt with briefly, though again as enough detail to give most programmers the information that they require and then it's on to the next interrupt. For those of you not sure when this is then I suggest that you go and buy the book, for those of you that do then you will be interested to learn that handling the screen is dealt with as detail complete with a program that allows you to scroll text on the screen with a joystick. All programs are given in both C and assembly format and assembly code where necessary, this means that you can read the assembly code to find out what the program is doing.

What is the heading of this new chapter getting your C16 and Plus/4 to play back in Basic and Machine code is covered. Finally we have a Basic program that shows you just what is possible from Basic. Following this is a program illustrating how to make a new computer play music on a cartridge. This is one instance in the book that I felt that the author could have provided a better explanation of the program and how to use something

similar to your own program.

The Book then enters the world of machine code programming. The first section, entitled *Introduction to Machine Code*, tries to teach machine code in only 13 pages.

I realize that this isn't possible and that whole books have been written on the subject of machine code. However, this section is excellent, it probably won't make anyone a machine code guru but it will stop people from looking at the word of the term and will show those, again through examples, how to print something to the screen, how loops work etc.

A full description of the T80 processor commands is given with the commands in alphabetical order with a description, their form of addressing, the assembler format, the number of bytes it occupies and how many machine cycles it takes to execute.

A description on how to use the computer to load kernel routines is given together with a list of them all. Now you have no excuse for not knowing how to LOAD and SAVE programs in machine code, or how to get a character from the keyboard in a machine code program, all this and much more is dealt with again in an

extremely clear way with the same of the routine being given its address in the Kernel when routines are used in all being given.

One exciting operators map of the computers is given, it's really important if you wish to use machine code. The map could have done with some examples of how to use the various addresses in your own benefit as I am afraid that beginners to machine code will find the function of many of the addresses totally baffling. The more experienced programmers will no doubt find all of the information that he requires though and this section will undoubtedly become one of the most treasured in the book. Maps of the TED chip and KERNAL jump table are also given which again will come in extremely useful.

If you have ever used a C16 then you will find the comparison of the memory maps of the C16 and C14 extremely useful. I know I did when I needed to find out where the border colour was stored on a C16 (in 1024) on the C14 but where programs store a C16? This comparison will show you.

The final section of the book provides the reader with some machine code utilities ranging from a joystick to an extension to an OLS (providing a NEWAL program) routine. Accompanying this article is a sample screen from this chapter of the book, I hope that this gives you a good idea of what is possible with this book.

Verdict

I must admit I have been waiting for a book like this on the C16 and Plus/4 ever since the machines were first unveiled. OK so the book isn't perfect and there is room for a lot of improvement. However, the book does provide the advanced programmer with all of the reference material that he should ever require.

If you are into serious programming then I would suggest that you buy it. It will become an invaluable if not the most important book in your collection.

Further

Name: C16/Plus 4 Reference Book
Price: £10.00 Publisher: Acorn Address:
Acorn Software, 4 New Court House,
Spall Street, Bedford, MK43 9SD
Tel: 0525 531141/531142/531143

3.3 TURBO MODE FOR THE C16

For all those who think the C16 is too slow, we can show you a trick with which it will become about 30% faster. Since we live in a turbo age, we simply call it the Turbo mode. The trick is to switch the screen off. Of course this is impractical if you need to create graphics and so on then at the same time, but not if you have no graphical problem to solve, where you don't always have to look at the screen. The speed advantage arises from the fact that the Video-Chip HD doesn't show when the Video Processor anywhere once the screen is switched off. A small demo program, first in Turbo mode and then in the normal mode, will show you how it works and how much time you can save.

```

100 POKE 43064,POKE(43064) AND 255
110 GOTO 150
120 POKE 43064,POKE(43064) OR 16
130 GOTO 150
140 END
150 T=0
160 FOR I=0 TO 1000
170 I=I+1
180 NEXT I
190 PRINT USING "###.###" T/1000
200 RETURN

```

Tape Head Reader

*Now you can find out more about how your programs
are sized*

Ref ID: A66666

The main incentive for writing the program was the interest that I observed in loading some types of programs. I wanted to try and use Nick Hungate's Fast-Flow routine (published in the February 1985 edition of *Wave Computerist*) to make fast loading personal copies of any of my own programs. To do this I needed to be able to extract details of programs from their headers.

The Header-Block program is quite simple and makes use of locations 50103-50106 (50103-50104) which in the Pico/4 and C16 are used as a current page buffer. Locations 50105 and 50106 give the start address of the program to be loaded, up to four high-byte forms, and locations 50105 and 50106 give the end address. Locations 50107 to 50106 contain the 16 characters which make up the program name. The header is read by use of command **CHPR** in line 800.

40-48 Convert the low-byte high-byte address in locations 8047 and 8048 to give the actual address of program in decimal and print.

70-79: Contains the low-byte, high-byte address in locations 70-75 and 76-79. To give the end address of program is decremented and added.

20 Subtract the start address from the end address. In your program length and count.

99 If the start address of the program is \$1001 this is often an indication that the program is basic rather than a block of code. The line communicates the message.

10-50 Option of reading another header or terminating the sequence

Volume 1

THE FUTURE

AF To contain the low-type component of the box start and end addresses

22 To contain the high-byte component of the hex start and end addresses

Ⓔ The combined high-byte start address

DE The connected graph has two types of vertices

A. The classical case of addition

E. The demand for public goods

U.S. DEPARTMENT OF JUSTICE

- 1 **File**
- 2 **Set up server policies**
- 3 **Clear screen, print title**
- 4 **Instruction to position tape at header**
- 5 **Get key press to continue**
- 6 **Open Channel 1 to read header**
- 7 **Clear screen, print title**
- 8-10 **Print contents of locations 010-015 (00101-00145)**
- 11 **Transfer locations 00107 to 00145 into Channel and reset**

[illegible]

Animator

Graphics can play a key part in C64 programming especially if you have the right. Our Animator should bring you one step closer to perfection.

By Allen Webb

Tanks to the speed available through computers, it is possible to achieve a wide range of graphical effects. As you will appreciate, the first steps developed for animation would be the creation of a number of similar pictures which, when displayed in sequence, give the impression of movement.

Animator allows you to design, store and subsequently play back a sequence of 60 pictures. Depending on the delay used, the sequence can take from about two seconds to about 24 minutes.

So that you don't have to mess about with various values, the Animator program is self contained and provides optional help.

- 1) Picture creation
- 2) Play back of the sequence
- 3) Saving and loading of files from tape or disk
- 4) A character designer

In order to keep the amount of typing to a minimum, I have taken two actions. Firstly, the package is in two parts, the editor/animator/chars, including module and the character designer. These modules are almost completely independent except that:

- 1) If you load and run the editor/animator module alone, you must use the design character option.
- 2) The character designer cannot save or load character files itself - it relies on the facilities in the editor/animator module.

Secondly, I have left out a spare

option. I originally intended to allow you to overlay animated sequences top of the animated backgrounds. I hope, in the near future, to write a third module offering the option which will use files created by these two modules.

Before I launch forth, let's consider what you might do with this package. When writing it, I had the younger ones in mind. Most children like cartoons and the ability to easily create and manipulate animated sequences is equally appealing. Having said that, the system is also of use to the more serious user. It's very handy to be able to quickly create and mess about with sequences for use in games. As such, it provides an ideal test bench.

The modules are given in the two listings. Once you've typed them in, SAVE them. To create a demonstration program, follow these steps:

- 1) Starting with a new machine, type in the list.

10 SYS 1200

2) Input the instructions

POKE 44,0 POKE 1234,0 NEW

in direct mode

3) LOAD and RUN the main module loader

4) LOAD and RUN the character designer loader

5) Input the instructions

POKE 44,1 POKE 45,200 POKE 46,34

in direct mode

6) SAVE the program

To test the use of the program, a series of operations used with programs to the keys available is required. The RUN/STOP key is used throughout to return to the previous menu or to leave the program.

On running, you will see the main menu. This gives the options

- F1 Edit mode
- F3 Animatic mode
- F5 Data manipulation
- F7 Groups characters

Pressing the relevant function key gives you the next menu.

Edit Mode

The edit menu gives the following options:

- F1 Input frame (this will only work properly if you are using a set of screen field characters corresponding to the normal set in use)
- F2 Save frame to RAM
- F3 Scroll mode. This gives a sub menu allowing character scrolling in four directions. The keys UP, L, R, and D perform these tasks.
- F4 Recall frame from RAM
- F5 Graphics mode. This gives a sub menu with the options:
 - H: Switch to high resolution graphics
 - M: Switch to monochrome mode
 - B: Switch to extended mode
 - C: Change background colour

1.1.4 Change colour registers

F6 Jump to next frame

F7 Toggle key repeat

F8 Set colour frame to current colour colour

Apart from these keys, there are controls for drawing the picture. Current keys: HOLD and CLR set or unset the cells within the frame. Control keys change colour registers as usual. Reverse field can be toggled as usual. Press any key to place the relevant character on the current image position in the current colour frame.

When you move a frame to RAM, both the characters and the colour of any frame are saved.

Animate Mode

This mode allows you to replay a specified sequence of frames. The menu shows the options:

F7 Set start frame

F8 Set finish frame

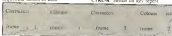
F9 Set delay between frames (1=fast, 250=slowest)

F7 Run sequence sequence

Data Mode

This allows the manipulation of data files.

The frames are saved in RAM as sequential blocks of data.



F1 allows you to save a block of frames to disk or tape. Pressing the full F9 frames occupy a lot of storage space, you can specify how many frames you save by setting the last frame to use.

F3 saves the block 12800 to 128FF. This is used by the character designer to build your modified characters.

F7 loads entire pictures or characters to the current address.

Character Designer

This module can be used independently but you will need a machine code monitor or similar to SAVE or LOAD the characters. It can also be used this way you enter the program by SYS 4061.

The designer screen has a number of features:

1) Along the top, the character set is displayed. The current character flashes.

2) The bottom few lines show the key options.

3) In the middle is the edit window. This shows the shape of the current character.

4) To the right of the edit window are shown the colours currently in the colour registers. These are shown as numbers beside a representation of the relevant bit plane.

5) Below the colours is a second window. On start-up, this is a single character. This can be expanded to give a 256 by 256 array of characters. This allows the design of large designs.

The operative keys are:

CTRL-N: This window can redefine characters and store loads the character set. You must use this command before you can start work on new characters.

+ Move to the next character

- Move to the previous character

M: switch to multi-colour mode

H: switch to high-resolution mode

C: copy the character specified by the next key pressed.

G: move to the character specified by the next key pressed.

R: reverse the current character

F: flip the current character, left to right.

S: rotate the current character

CTRL-B: switch on key repeat.

CTRL-Q: switch off key repeat.

F1: scroll current character horizontally.

F3: scroll current character vertically.

X: expand window horizontally.

Y: expand window vertically.

CTRL-C: reduce window horizontally.

CTRL-V: reduce window vertically.

U: Update window to view of current character.

P: set a point in the character and move the cursor horizontally to next point.

S: set a point in the character and move the cursor vertically to next point.

SPACE: clear a point in the character and move the cursor horizontally to next point.

CTRL-Z: clear a point in the character and move the cursor vertically point.

The cursor keys, HOME and

CLEAR act as normal except that they act on the edit window.

1.1.5 Change colour registers (1 frame)

I know that the range of key presses is large but I'm sure that you'll find the program easy to use.

To help you through the system, here is a simple word, screen.

On entering the program, you see the main menu. Press F7 to enter the character editor. Press CTRL-N to create the definable character set. You should see the nibbles in the edit area change to a giant '0' character. Try some of the keys to change the shape of the design. You will see that each screen is referred to as the normal 'flashing' '0' at the top of the screen. Move on to the next character ('A') by pressing + and release that. Once you've got a few modified characters, press RUN/STOP once to return to the main menu.

Press F1 to enter edit mode. You should see a cursor flashing in a rectangular area of screen. The prompt bar should show you that you are set up for screen 1. Press F8. The edit area should be filled with garbage. You've just scrolled screen 1 from RAM. Press ctrl-CLR followed by F8. This shows the edit area and lets it's colour to show (the current colour). Press a few keys. You should get the character corresponding to the keys pressed. Press F7 to return word mode. You will see a prompt bar showing which keys operate. Press a few and see what happens. Press RUN/STOP to return to the edit mode. Press F3 and have a quick nibble with the colours and graphics modes. When you've designed screen 1, press F2 to save it to RAM. Always save the screen before leaving a mode or you'll lose the design. Clear the screen and press F4. You should see just design again. Move onto the next frame by pressing F6. The edit screen control are retained so that you don't have to re-enter it. Try drawing and saving a few screens. Press RUN/STOP to return to the main menu.

Press F3 to enter animate mode. See the start frame to start first frame (F1) and the finish frame (F6) to view last frame. Try playing the sequence in different delay speeds. Press RUN/STOP to exit to the main menu.

Press F5 to enter the data storage mode. Try saving and reloading your character set and a sequence sequence. To exit from the program press RUN/STOP when at the main menu. 22

[illegible][illegible]

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Fresh Chips

With the Printer IV chip you can improve the quality of the copy you get from your MPS 801 printer

By Paul Eves

One of the biggest drawbacks of the MPS 801 printer is the lack of true descenders. There have been many programs written to overcome this problem. There have also been many top quality programs written which provide the user with the option of many different font styles (Pica, Minion et al) and which springs to mind. All these programs have one thing in common: As software, the user has first to go through the process of loading in the program, then selecting a given font from a menu before getting on with the job in hand.

Printer IV, on the other hand, has none of these drawbacks, as hardware, once the chip has been installed you just flip a switch and away it goes. The selected font is now ready to go.

Fitting the chip is a simple task. It only took me three minutes and I am hopeful it will take yours. Instructions for fitting Printer IV are as follows:

- 1 Disconnect the printer from the mains, remove the paper cover, paper shelf and feed latch.
- 2 Using a cross head screwdriver, remove the four screws holding the upper housing and the lower housing together. Lift the top away to expose the two holding the electronics. Lift and remove the tray to the rear of the printer. Using a flathead screwdriver carefully lift out the original character ROM chip (this is a 2M pin chip).
- 3 Take careful note of the position of the chip as it is a small notch on one end.

1. Take the Printer IV character chip together with adaptor, and fit this into the carrier that housed the original chip (taking note of the position of the notch on the chip which should sit inside slots for fitting the right of the printer looking from the front). The fly lead with the two logic switches can be placed so that it have drilled a small hole in the rear of the housing (provided it through and it is now perfectly secure).

4. Re assemble the printer and you are ready to use your new character sets. **CAUTION:** Disconnecting the printer will

overload your memory if it is still on line at the time.

There are four character sets available to you:

- 1 Densland
- 2 Script
- 3 Echo
- 4 Futuristic

When using a word processor, it is advisable to use a pause command before switching between character sets.

It is inadvisable to switch between sets while the printer is actually printing. This will cause corrupted characters and will also result in a blank line inside the printer.

I would also advise that you put the original ROM chip safely away somewhere.

For anyone who uses their printer often this chip is a must. It's quick and easy to use and the end result is impressive.

PE

PRINTER IV ROM OPTION

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11 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	11 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
12 00000000000000000000000000000000	12 00000000000000000000000000000000
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27 00000000000000000000000000000000	27 00000000000000000000000000000000
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29 00000000000000000000000000000000	29 00000000000000000000000000000000
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31 00000000000000000000000000000000	31 00000000000000000000000000000000
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45 00000000000000000000000000000000	45 00000000000000000000000000000000
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49 00000000000000000000000000000000	49 00000000000000000000000000000000
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62	62

Plus/4 Dumper

Now you can transfer what's on your screen to paper via your printer and obtain a hard copy of everything you do.

By Mick Healey

Many larger industrial computers offer a screen-dump facility. This means that whatever is pointed on the screen can be reproduced exactly on paper. Fortunately, paper can be devoted of just about anything you like including: photographs, screen diagrams, mechanical diagrams, period stock lists, program modifications etc.

There are programs around for text dumps, but most seem to be written in Basic and need to ask the user questions (like upper or lower case text) before they will do a dumpout.

Enter then, the all-umping all-dumping, intelligent screen dump program. This program will check automatically whether upper or lower case text is being displayed and print accordingly. Reverted characters are also recognized and dealt with by this program (asynchronously). There is, of course, one BUT... but it cannot print the double quotes symbol. This is due to an inherent function of the MPS-801 printer. When this printer prints a double number of double quotes it seems to give ASCII values for the printer control codes used by this program. The result is a totally disorganized mess which does not look much like the original. For this reason the double quotes symbol will be replaced by a single quote every time it appears. This is unfortunate but is the same method used by the word processor package on the Plus/4 itself.

While I am on the bad points, I should also mention that certain characters cannot be dumped from the text screen, though they can from the graphics screen. Also, when obtaining a graphics dump the first three rows of

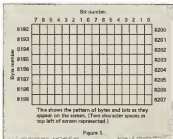
pixels on the screen will not be dumped though this is usually unimportant.

Great care has been taken to make this program 'friendly' to basic skills variables. Once loaded this program can be considered as one of the computer's functions. It lives and works between locations 14000 and 14070. Some of the routines used need to change values stored in page zero. This would then upset important variables stored in page zero and cause the computer to crash. For this reason the program will store page zero (in its entirety) in a safe place, before any dumping is done. Page zero is then restored at the end of the program. The

end result of this is that the computer has been made to produce a printout, and will continue to do what it was doing before (so if anything had happened (i.e. this program is available).

The function keys have also been re-assigned. This allows the text/graphics dump to be used in direct mode as well as program mode (Pressing function key F1 will cause a text dump to be produced. Function key F4 gives a graphics dump. To include these routines in a basic program then call the following:

SYS 16161 for a text dump
SYS 16645 for a graphics dump



Memory Allocation

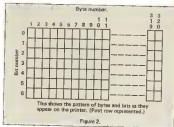
The following addresses are all in hexadecimal; the descriptions explain what happens in that area of memory.

- 8040 - 805F - instruction logic (pre-occupied)
- 4000 - 4104 - first dump program
- 4105 - 4204 - graphics dump program
- 4205 - 4290 - save page area on disk & not routine
- 4291 - 429D - restore save area to page zero routine
- 429E - 441D - graphics screen address table
- 441E - 4434 - unprocessed graphics characters
- 4435 - 443C - processed graphics characters
- 443D - 452E - output buffer (graphics & text)
- 452F - 467E - save area for temporary of page zero

Text Dump

The text dump is basically a code conversion. Firstly, all of page zero is stored into memory at 4401F by the routine at 41264. This will protect all routines at page zero from the effects of the dump. The contents of location 5FF12 are then stored to one of the screen in displaying upper or lower than 128. A character is then displayed to the screen. The appropriate font will be selected according to the contents of 5FF14 (on pages 48-49 of the MPS 801 User Manual). Locations 125 and 126 are loaded with the start address of the text screen (44C00). The X register (row counter) and the Y register (column counter) are cleared and both set to zero. Location 5418 is a register which keeps track of how many characters are to be sent to the printer to produce a row of print. The value stored in 5418 will vary depending on how many inverted characters are to be sent. Every time a reversed character is to be printed, three characters have to be sent. RVS ON the character RVS OFF. Location 5419 is set to zero for each row being processed as is the Y-register.

A problem exists with the text dump which is the reason for the length of the text dump program. The characters stored in text screen memory are stored as screen display code. Characters to be sent to the printer must be sent as ASCII code (see pages 252-256 of the Plus/4 User



Manual). As can be seen from the two tables in the User Manual, each character has two different values. Conversely the characters have been grouped into sets of 32. It is the order of the sets that is different. The program takes a character from the text screen memory and finds out which set of 32 it is in (screen display code).

From this point it is mainly a case of adding a pre-defined number to do the conversion. The method used is first which set a character is in, is simply a case of subtraction. The character value is taken #120 subtracted and an accumulator is checked to see if it contains a positive number. If it does contain a positive number then the character must belong to a higher group of 32 characters. In this case the #60 is added back to the number and the value is contained in the same way by subtracting #540. #540 and #60 in that order. Each time if the answer is positive the number subtracted is replaced. When the result in the accumulator is not positive then the program has located which block of 32 the character belongs to. The program will then add #120 #120 #60 #60 depending whether the character is in the first, second, third or fourth set of 32 characters respectively.

Example

Assume the character to be processed is the space symbol. As can be seen in the SDC table it has a screen display

code of 51 (decimal) which is 540 in hex. To convert to ASCII the program follows this method:

```
#540 screen display code for space symbol
#531 subtract #120
ANSWER IS POSITIVE SO NOT IN THIS GROUP OF 32
#541 replace #550
#531 subtract #540
ANSWER IS POSITIVE SO NOT IN THIS GROUP OF 32
#541 replace #540
#561 subtract #540
NOTE THE NUMBER HAS WRAPPED AROUND THE NEGATIVE FLAG IN THE PROCESSOR HAS BEEN SET. THIS IS THE CORRECT GROUP OF 32 CHARACTERS
#561 add pre-defined number #60
THIS IS THE ANSWER #540 IS 51 IN DECIMAL CHARACT IN THE SPACE SYMBOL
```

However, just before the above process is executed, the screen display code currently being processed is ANDed with #580. If the result is less than or equal to #37F then the above process is executed as the normal way. If however the result is greater than #380 then the program restores it by adding with a reversed character up to #580 #12 in the next line location in the output buffer #549D plus the contents of #531. This sets the printer up for RVS ON. The value in 549 is maintained by #531. The character is then converted to the normal way and

stored in the next free location in the output buffer. If the program is dealing with a reversed character then it will store it first in the next free location (RLE C/P) and upon encountering the next character

When each character has been fully processed and stored in the output buffer (encoding: EWS ON and EWS OFF codes) the Y-engineer is incremented by \$B011. When the Y-engineer reaches \$B28 one row of text has been processed and is stored in the output buffer. The routine is \$B4AF then sends the processed data to the printer, followed by a carriage return. The X-engineer is incremented by \$B03 and compared with \$B09F. If it is less than \$B010 then the text across row (column) passed on (\$B12D \$B12F) is incremented by \$B28 and the whole amount remaining for the next row.

When all rows have been printed the printer is set to the default font and the channel to the printer is closed. Page 200 is restored by the routine at 04204 and the program returns to Basic as if nothing had happened.

The program works because each high-resolution image on the server is actually made up of 64,000 data points individually selectable arranged in a database (though rather complex) pattern in much the same way that printer produces its image using a pattern of dots although the way the dots are arranged is very different.

In essence then, this program must translate the pattern of dots on the screen, in a pattern recognizable by the printer, while preserving the image, to be printed.

Because there are 64,000 instructions or all of which have to be translated and sent to the printer, it can be seen that a great deal of processing has to be done. The programmer/user will want their program as quickly as possible (or because that would be convenient - time is money!) so the whole routine has been written as machine code. This is not a comfortable time to write code.

the equivalent Risc program which took 25 minutes to produce a single 14-page screen dump. In machine code this process is reduced to three minutes. This is still fairly slow—but, as the maximum speed options for using the M89500 printer. The reason for this is the size of the printers output buffer—90 bytes. A single row of the high-resolution screen (512 bytes, in color) for the printer to produce a single row of the high-resolution screen on the fly must be stored and consumed four times. The

reverse reading 50 bytes of translated data from the computer - telling the computer not to send any more data - printing the 50 bytes now in the input buffer - request the next 50 bytes and so on. In other words the program head must make four passes for each row of built test screen.

Building electronic systems may find a way to make the input buffer larger and so reduce the primary time-the rest of us will have to wait a new processor.

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Website: www.1365.com

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974	2975	2976	2977	2978	2979	2980	2981	2982	2983	2984	2985	2986	2987	2988	2989	2990	2991	2992	2993	2994	2995	2996	2997	2998	2999	3000
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4220	00	00	000	05210	4290	00	00	LDA	04990
4221	00	00	000	05220	4291	00	00	LDA	04990
4222	00	00	000	05230	4292	00	00	LDA	04990
4223	00	00	000	05240	4293	00	00	LDA	04990
4224	00	00	000	05250	4294	00	00	LDA	04990
4225	00	00	000	05260	4295	00	00	LDA	04990
4226	00	00	000	05270	4296	00	00	LDA	04990
4227	00	00	000	05280	4297	00	00	LDA	04990
4228	00	00	000	05290	4298	00	00	LDA	04990
4229	00	00	000	05300	4299	00	00	LDA	04990
4230	00	00	000	05310	4300	00	00	LDA	04990
4231	00	00	000	05320	4301	00	00	LDA	04990
4232	00	00	000	05330	4302	00	00	LDA	04990
4233	00	00	000	05340	4303	00	00	LDA	04990
4234	00	00	000	05350	4304	00	00	LDA	04990
4235	00	00	000	05360	4305	00	00	LDA	04990
4236	00	00	000	05370	4306	00	00	LDA	04990
4237	00	00	000	05380	4307	00	00	LDA	04990
4238	00	00	000	05390	4308	00	00	LDA	04990
4239	00	00	000	05400	4309	00	00	LDA	04990
4240	00	00	000	05410	4310	00	00	LDA	04990
4241	00	00	000	05420	4311	00	00	LDA	04990
4242	00	00	000	05430	4312	00	00	LDA	04990
4243	00	00	000	05440	4313	00	00	LDA	04990
4244	00	00	000	05450	4314	00	00	LDA	

The program is stored in RAM starting at location 84103 (116643 decimal) and is protected from being read or modified. When the program is loaded in its memory an address to its starting location 84290 (117624 decimal) is also loaded. This address will contain the start address of each row on the screen. The program takes seven of these start addresses to produce the first row of print on the printer. It should be noted that a single row on the screen is eight data deep, the printer can only print seven data deep and this is the main reason for the address table. The eighth address is stored forward and used as the first address in the second row.

The program uses these addresses to look at the screen and decide which data are 'ON' and which are 'OFF'. This process is not complicated to explain or much detail without writing a book so an assembler listing has been included for the inquisitive reader code programmers.

Briefly:

The main working parts of this program are the address table (a set of eight 'dummys' bytes, which store the results as they are obtained, the result buffer' which stores the 320 bytes to be sent to the printer). The data on the screen are printed from left to right (eight data bytes) on the screen, when they are arranged from top to bottom on the printer (see Figs 1 and 2). Each byte on the screen represents eight data across the screen, but on the printer only seven data down the paper. The program looks at the first eight bytes in turn on the screen (of which only seven bytes from the address table are being processed) to see if it is a 'ON' or 'OFF'. If the bit is OFF then the program looks at the same bit on the next byte. If the bit is 'ON' then a number to the power of two is added to the appropriate 'dummy bytes' (NOTE: these 'dummy' bytes are always preset to 0 before processing a set of seven bytes). The number which is added is the power of two is derived from whatever of the seven bytes is being worked upon (i.e. if it is the first of the seven bytes then add 316 to the appropriate 'dummy' byte, if it is the second then add 312, the third add 313 and so on).

The result of all this processing is eight seven-bit numbers all less than or equal to 511 (2⁷). To each of these

numbers the program adds 320 (128). The final eight results are then stored in the 320-byte buffer (located at 84410 (117668)).

The program then adds 320 to each of the seven addresses it took from the address table and repeats this and the above process 40 times. It has then translated the first row on the screen.

At this point the 320 bytes of data that have been processed are now ready to send to the printer, which it does. When the printer has done its bit (transmit four pages of the print head) the program takes the next seven addresses from the address table and repeats the above process 20 times, so printing all rows and hence the entire screen (well, all except the bottom three rows of the last row - which did not justify the extra programming required).

The program must now return to those steps (the steps given at left). This has been achieved by saving ALL of page zero in a safe area of memory starting at 8437F (117741) before any translation starts (i.e. at the beginning

of the program). Page zero is then returned to its rightful place after all processing is complete (i.e. at the end of the program). When the RTS (returning to the end of the program is encountered, the program will send the processor to the point it started before a program was requested.

The instructions below are quite complicated at first, but are really very simple. The whole program does not have to be entered at one sitting provided you know how to save a file is saved. If at any time you decide to save what you have typed, simply access the first SAVE routine in the instructions and make a note of the address you have reached. At the next sitting you can reload the program using the same specified in the next routine. You may then carry on as if nothing had happened starting at the address noted previously. The one thing to watch is to change the filename of that routine when you need to save it again.

First actions

NOTE: Do not deviate from the sequence, it can very soon become confusing otherwise.

- 1) Refer to the listing 'FUNKEY'.
- 2) Type MONITOR (enter).
- 3) Type M:RST (return).
- 4) Change the values that appear on the screen, by typing over them to the values in the listing 'FUNKEY'. Do not attempt to start the internal characters on the right of each row.
- 5) Type R:FUNKEY 00000000FF where n=1 for tape or n=0 for disk. **NOTE:** The first program has been saved on tape or disk.
- 6) Refer to the listing 'GRATEX'.
- 7) Type A:400 J&K 3434 (return).
- 8) The screen will now prompt you with 34000. Type LDA 3FF (3 return).
- 9) Continue in this fashion until the end of the 'GRATEX' listing.
- 10) Type S:GRATEX n-4000-0200 where n=1 for tape or n=0 for disk.

MONITOR TABLE									
	00	01	02	03	04	05	06	07	08
0000	00	00	00	00	00	00	00	00	00
0001	00	00	00	00	00	00	00	00	00
0002	00	00	00	00	00	00	00	00	00
0003	00	00	00	00	00	00	00	00	00
0004	00	00	00	00	00	00	00	00	00
0005	00	00	00	00	00	00	00	00	00
0006	00	00	00	00	00	00	00	00	00
0007	00	00	00	00	00	00	00	00	00
0008	00	00	00	00	00	00	00	00	00
0009	00	00	00	00	00	00	00	00	00
0010	00	00	00	00	00	00	00	00	00
0011	00	00	00	00	00	00	00	00	00
0012	00	00	00	00	00	00	00	00	00
0013	00	00	00	00	00	00	00	00	00
0014	00	00	00	00	00	00	00	00	00
0015	00	00	00	00	00	00	00	00	00
0016	00	00	00	00	00	00	00	00	00
0017	00	00	00	00	00	00	00	00	00
0018	00	00	00	00	00	00	00	00	00
0019	00	00	00	00	00	00	00	00	00
0020	00	00	00	00	00	00	00	00	00
0021	00	00	00	00	00	00	00	00	00
0022	00	00	00	00	00	00	00	00	00
0023	00	00	00	00	00	00	00	00	00
0024	00	00	00	00	00	00	00	00	00
0025	00	00	00	00	00	00	00	00	00
0026	00	00	00	00	00	00	00	00	00
0027	00	00	00	00	00	00	00	00	00
0028	00	00	00	00	00	00	00	00	00
0029	00	00	00	00	00	00	00	00	00
0030	00	00	00	00	00	00	00	00	00
0031	00	00	00	00	00	00	00	00	00
0032	00	00	00	00	00	00	00	00	00
0033	00	00	00	00	00	00	00	00	00
0034	00	00	00	00	00	00	00	00	00
0035	00	00	00	00	00	00	00	00	00
0036	00	00	00	00	00	00	00	00	00
0037	00	00	00	00	00	00	00	00	00
0038	00	00	00	00	00	00	00	00	00
0039	00	00	00	00	00	00	00	00	00
0040	00	00	00	00	00	00	00	00	00
0041	00	00	00	00	00	00	00	00	00
0042	00	00	00	00	00	00	00	00	00
0043	00	00	00	00	00	00	00	00	00
0044	00	00	00	00	00	00	00	00	00
0045	00	00	00	00	00	00	00	00	00
0046	00	00	00	00	00	00	00	00	00
0047	00	00	00	00	00	00	00	00	00
0048	00	00	00	00	00	00	00	00	00
0049	00	00	00	00	00	00	00	00	00
0050	00	00	00	00	00	00	00	00	00
0051	00	00	00	00	00	00	00	00	00
0052	00	00	00	00	00	00	00	00	00
0053	00	00	00	00	00	00	00	00	00
0054	00	00	00	00	00	00	00	00	00
0055	00	00	00	00	00	00	00	00	00
0056	00	00	00	00	00	00	00	00	00
0057	00	00	00	00	00	00	00	00	00
0058	00	00	00	00	00	00	00	00	00
0059	00	00	00	00	00	00	00	00	00
0060	00	00	00	00	00	00	00	00	00
0061	00	00	00	00	00	00	00	00	00
0062	00	00	00	00	00	00	00	00	00
0063	00	00	00	00	00	00	00	00	00
0064	00	00	00	00	00	00	00	00	00
0065	00	00	00	00	00	00	00	00	00
0066	00	00	00	00	00	00	00	00	00
0067	00	00	00	00	00	00	00	00	00
0068	00	00	00	00	00	00	00	00	00
0069	00	00	00	00	00	00	00	00	00
0070	00	00	00	00	00	00	00	00	00
0071	00	00	00	00	00	00	00	00	00
0072	00	00	00	00	00	00	00	00	00
0073	00	00	00	00	00	00	00	00	00
0074	00	00	00	00	00	00	00	00	00
0075	00	00	00	00	00	00	00	00	00
0076	00	00	00	00	00	00	00	00	00
0077	00	00	00	00	00	00	00	00	00
0078	00	00	00	00	00	00	00	00	00
0079	00	00	00	00	00	00	00	00	00
0080	00	00	00	00	00	00	00	00	00
0081	00	00	00	00	00	00	00	00	00
0082	00	00	00	00	00	00	00	00	00
0083	00	00	00	00	00	00	00	00	00
0084	00	00	00	00	00	00	00	00	00
0085	00	00	00	00	00	00	00	00	00
0086	00	00	00	00	00	00	00	00	00
0087	00	00	00	00	00	00	00	00	00
0088	00	00	00	00	00	00	00	00	00
0089	00	00	00	00	00	00	00	00	00
0090	00	00	00	00	00	00	00	00	00
0091	00	00	00	00	00	00	00	00	00
0092	00	00	00	00	00	00	00	00	00
0093	00	00	00	00	00	00	00	00	00
0094	00	00	00	00	00	00	00	00	00
0095	00	00	00	00	00	00	00	00	00
0096	00	00	00	00	00	00	00	00	00
0097	00	00	00	00	00	00	00	00	00
0098	00	00	00	00	00	00	00	00	00
0099	00	00	00	00	00	00	00	00	00

10) Refer to the listing "TABLE"

12) Type: M:4292 (return)

13) Change the values on the screen to those in the listing "TABLE" by overtyping. When the first character has been changed then type M (return) to obtain the next character. Continue in this fashion until the end of the listing "TABLE"

14) Type: S:TABLE" is 4292,4422 when a=1 for tape or a=1 for disk

15) Type: L:GRATEX,a (return) a=1 for tape or a=2 for disk

16) Type: L:TABLE,a (return) a=1 for tape or a=2 for disk

17) Type: S:SUPERDUMP",L:4080 4422 (return)

NOTE: make another backup copy on another tape or disk

18) Type: X (return) you are now back in Basic

19) Enter the following Basic program

```
10 GRAPHIC1:GRAPHICS FORS
44,73 POKIN46 73 POKIN50 72
20 NEW
```

20) Type: DRAWNEW" (return)

NOTE: If using a disk drive then the programs GRATEX and TABLE may be stored from the disk since they are now combined under the heading "SUPERDUMP"

To do the exact the following Basic commands

```
SCRATCH "GRATEX.D0 (return)
SCRATCH "TABLE.D0 (return)
```

If it has worked out well, you should now have three programs: "WINKLEY SUPERDUMP" and "NEW"

This program is very simple to use once loaded. To load the program into memory follow these instructions

1) Switch the Plus/4 OFF then ON again. (The best reset known)

2) Type: S:LOADNEW" (return)

3) (LOAD for tape) then RUN (return)

4) Type: MONITOR (return)

5) Type: L:TABLE,a (return) a=1 for tape or a=2 for disk

6) Type: L: SUPERDUMP",a (return)

7) Type: X (return)

The computer is now in Basic and the Superdump program is in memory

The superdump may be used as direct mode or program mode

Direct Mode

Stop your program when the screen you want to print is being displayed Press F1 for a full dump Press F2 for a graphic dump That's it the Plus/4 does the rest

Program Mode

When writing a program you may decide that a superdump option would be useful. This is very simple to achieve. Simply include the appropriate instructions (below) for your requirement

```
TEXT DUMP type SYS16384
GRAPHIC DUMP type SYS16403
```

Again, the computer will do the rest

It is not true that this program will be of any great interest to many people. This program took me no months to produce (apart fromages) and to me at least, was worth every minute. 72

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Fault Finding

Entering a program into your computer only to find that it doesn't work is extremely frustrating. Here are a few tips on some of the most common problems.

By Stuart Cooke

Whether you are entering a program from a book or magazine or you are trying to create your own manuscript, those little bugs always waiting to slip their way into your code sometimes:

"So what do you do?" Well, the first and most obvious method of debugging a program is to go on down and read it through. Does that isn't infallible, and so I speak from experience, you check it, your neighbour checks it, Frankie the family parrot sees you enter the job. Just trail the error bugs in their somewhere.

Having dealt with people's programming queries for a number of years I have noticed a several specific programming mistakes appearing time and again and again. I hope this article will provide some tips that will help you to debug your programs more easily.

Know it All

Some people think that the computer is a device that is totally infallible, that isn't the case. Probably the most common problem is the fact that the computer gives you an error in a certain line number. You go to the line check it, check it again and even get someone else to check it. Don't be fooled, just because the computer says that the error is in line N, DON'T BELIEVE IT. Your problem may be elsewhere. I shall prove this point in an example later in this article.

All Black

Quite often people will write or type in a program, RUN it and then find they might get a black screen. One of the most common mistakes here is that you have not realised that the computer may be giving you an error report. It's

just that you can't see it. A small example will illustrate just what I mean. Type the following into your computer:

```
10 POKE 9128:POKE 9281:0
20 PRINT "[BLACK] HELLO
   WORLD"
```

Line 10 should be replaced with the following if using a C16, Plus/4 or C128:

```
30 COLOR 9:COLOR 4:1
```

Don't forget those in square brackets are macrocodes for Commodore colour codes. Read *Learning* if you are not sure about this. [BLACK] means print the CONTROL all keys at the same time.

RUN this program and see what happens. The program works OK, you simply can't see the message that is printed since it is printed on a black background with black text. Line 10 simply sets the border and screen to black.

Now this program works without any problems, but what would happen if there was an error in there? Let's add a line to the above example:

```
30 THIS WILL CREATE AN
   ERROR
```

As you are no doubt aware this line will cause a SYNTAX ERROR when the program is RUN. Let's RUN it and see. What happened? Nothing seemed to happen, your screen is still black. The error message will be printed out, you simply can't see it as it is on black on a black background. If we change the colour of the text in line 30 then all should become apparent. Change line 30 to:

```
20 PRINT "[WHITE] HELLO
   WORLD"
```

Remember what I said about square brackets.

Now RUN the program and you will see the SYNTAX error message appear.

You must think that this is an extremely simple error and that every one should spot it. It may be simple but is overlooked surprisingly often.

C128 owners have a further problem: the FAST command. For those of you not used to this command it simply turns off the display of the C128 which means that the computer speed will increase. You can still print to the screen, but you can't see what you put on it. So what would happen if the computer threw across an error? You would get the same effect as above. The error message will be printed to the screen but just won't be able to see it. As a general rule of thumb, when entering a C128 program omit all FAST statements until you are sure that the program is working correctly. Then put the FAST statement back in.

If you own a C128 then you could try the following program to demonstrate this:

```
10 FAST
20 PRINT "HI THERE!"
30 I'M GOING TO CAUSE AN
   ERROR
```

Now RUN the program. The program will print out the message line 20 and line 30 will generate an error message, you simply can't see it.

Enter the following command on the keyboard. You won't be able to see it so type carefully:

SLOW

Your screen will now come back on and you will see both the "HI THERE!" and the error message.

So if your screen is blank, and nothing is happening what should you do?

On a C128 you could first try typing SLOW just to clear the computer but here you are lost mode. On other computers and the C128 if the above fails, by changing the ink colour to one of the colour mappings, CONTROL and a number will do this. If the error does re-appear then you know that your program has finished and printed some sort of message on the screen. Find out where the colour of the ink is changed so that of the background within the program change it to something else and re-run the program. You will now see the message when the program stops.

Illegal What?

Quite often programs will be published that contain a lot of DATA statements. Sometimes within the program that DATA will be READ and the value then POKE'd into memory. Now Commodore warn this type of program quite a lot as a way of getting machine code into memory. One of the most common problems that people get with these is that when the program is RUN, the computer responds with an ILLEGAL QUANTITY ERROR in some line like if you enter the following example I will show you, in 1 printed, then the computer is not always right.

```
10 FOR COUNT=0 TO 7
20 READ NUM
30 SUM = SUM + NUM
40 POKE 49152 + COUNT, NUM
50 NEXT COUNT
60 READ CHECK
70 IF SUM<=CHECK THEN PRINT
"ERROR" STOP
80 PRINT "FINISHED"
90 DATA 10,10,100,100,100,100,
100,712
```

This use of loader is used in Tim Commodore even more, every line has two check sums on the end, the total of the numbers that have been read being worked out in line 30. This is then compared with the checksum READ in line 60 and compared with SUM in line 70. If there is a difference then the computer reports the error and STOPs.

Let's RUN the program and see what happens. You should get an error message ILLEGAL QUANTITY ERROR IN LINE 40. Your mistake

in section is to check line 40. But there's nothing wrong with this so what is the problem?

40 ILLEGAL QUANTITY ERROR means that a number has been used that is too large. So let's have a look at line 40. In this line we POKE 49152 + COUNT with the number that has been READ from the data statement. The maximum value that 49152 + COUNT can reach is 49152 + 7 (see the For Next loop on the first line) which is 49159. There is nothing wrong with this so what's the problem that has been read? You can only POKE a number up to 255 into memory. What must have happened is that you are trying to POKE a number greater than 255 into the computer's memory. If we tell the computer to print the number out when it stops with an error message our first will be confirmed. RUN the program again and then type the following line when the program stops.

```
PRINT NUM
```

The computer should respond with 712. Hence the illegal quantity error. You can only POKE a number up to 255 into memory, a number? So what has gone wrong? Let's follow the program through.

Line 10 is a loop that repeats eight times, COUNT going through 0,1,2,3,4,5,6 and 7.
Line 20 READs the next number from the data statement.
Line 30 adds this number to the current value of sum.
Line 40 POKEs the value that has been read into memory.
Line 50 goes back round the loop eight times.
Line 60 the checksum is read.
Line 70 the sum is compared with the checksum and the program stops if they are not the same.
Line 80 is the end of the program.

So what is our problem? Eight pages of DATA are read, the sum is then read and the program should stop. If we take a close look at line 100 you will see that there are only seven pairs of data and the check sum. This means that instead of the last number being read and POKE'd into memory the program READs the checksum and tries to POKE this into memory, giving you your illegal quantity error. The number 100 is moving from line 100. In this case the fact that a number was missing from line 100 was easy to spot.

After all we only have one line of DATA in the program. How could we skip 60 there 491550 700 or more lines of DATA? How could you find the line where the DATA was missing?

System Variables

The designers of the Commodore series of computers are certain users of the computer's memory to hold information about everything on the computer. The following system variables hold the line number of the last DATA statement.

61, 62 on the C64, C16 and Plus/4
65, 66 on the C128

The line number of the last DATA statement can be found by entering the following line.

```
PRINT PEEK (61) + 256* PEEK (62)
or
PRINT PEEK (65) + 256* PEEK (66)
on the C128
```

Re-run the above program when the computer stops with the error message it's the PEEK and you will find that the number 100 is printed - the line where the error is. So now you can find where in your program the computer is READing DATA from and if there are hundreds of lines

Correct Version?

Let's correct the above program and see if it works. Re-enter line 100 to read.

```
100 DATA 10,10,100,100,100,100,
101 100,712
```

RUN the program again and all should be well. The computer comes up with FINISHED and no more messages are printed so everything should be OK. Well I'm afraid that it isn't.

Adding Up

The main failing of this type of program is that the check on the line is simply a sum of all of the numbers. Therefore 1+2+1 would give you a checksum of 4. However 1+1+1 would also give you an even though the numbers are not in the correct order. If these numbers were part of a machine code program the fact that they could be in the incorrect order may cause the program not to work correctly at even check. The pointer

code here. It simply "Do not assume everything is correct even if the computer says it is." To prevent pain, the above program still has a break. Line 100 should read:

100 DATA 101,102,103 etc

However it actually reads:

100 DATA 102,101,104 etc.

The sum of the DATA may be the same but as machine code the system would mean something very different.

So if your program doesn't work then CHECK THE DATA.

Trivia?

You may think that the above is simple well it is. However most around 80% of the program queries that we get in the *Your Commodore* office are due to one of the above faults. It is obvious that the simple things are quite often overlooked.

On From Here

At *Your Commodore* we try to publish

high quality programs that are of benefit to as many people as possible. This generally means that the programs are usually very large and often prone to typing errors. In order to make your life easier we are starting a "Bug Finding Service". If you have typed in one of our programs and despite much checking still can't get the program to work then send it to us the following:

Two copies of your program on tape or disk.

A description of what your problem is if possible: a listing of your work area for assistance.)

A stamped self-addressed envelope for return of program to you.

Should any of the above be missing then we will not be able to deal with your query.

We will try to point out where you have made any errors and place a corrected copy of the program back on its sort tape or disk before we return it to you.

Do not send a program to us as soon as it stops working, check it

yourself first. If you don't it only wastes valuable time that we could be spending working on the magazine.

We do get a large number of queries in the office so it may take some time for your query to be processed.

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